ESIE13-03
Version 1.0

Service Manual

Ground source heat pump

EGSQH10S18AA9W

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Part 1. Introduction

1. Version log

Version history.

Version code	Description	Date
Draft 0.1	Preliminary release	20/12/2013
Version 1.0	Addition of hyperlinks from troubleshooting tables towards check and replacement procedures	13/01/2014

2. Safety precautions

The precautions described in this document cover very important topics, follow them carefully.

All activities described in the service manual must be performed by an authorized person.

If you are not sure how to install, operate or service the unit, contact your dealer.

In accordance with the applicable legislation, it might be necessary to provide a logbook with the product containing at least: information on maintenance, repair work, results of tests, stand-by periods, …

Also, at least, following information must be provided at an accessible place at the product:

- Instructions for shutting down the system in case of an emergency
- Name and address of fire department, police and hospital
- Name, address and day and night telephone numbers for obtaining service

In Europe, EN378 provides the necessary guidance for this logbook.

2.1. Meaning of symbols

	WARNING Indicates a situation that could result in death or serious injury.
	WARNING: RISK OF ELECTROCUTION Indicates a situation that could result in electrocution.
	WARNING: RISK OF BURNING Indicates a situation that could result in burning because of extreme hot or cold temperatures.
	WARNING: RISK OF EXPLOSION Indicates a situation that could result in explosion.
	WARNING: RISK OF POISONING Indicates a situation that could result in poisoning.

	CAUTION Indicates a situation that could result in equipment or property damage.

	INFORMATION Indicates useful tips or additional information.

2.2. Warnings

	WARNING Improper installation or attachment of equipment or accessories could result in electric shock, short-circuit, leaks, fire or other damage to the equipment. Only use accessories, optional equipment and spare parts made or approved by Daikin.

	WARNING Make sure installation, testing and applied materials comply with applicable legislation (on top of the instructions described in the Daikin documentation).

	WARNING Make sure the work site environment is clean and safe to work in. Beware of spilled fluids, like water, oil or other substances. Protect bystanders from injury and property from possible damage cause by service works.

	WARNING Wear adequate personal protective equipment (protective gloves, safety glasses,…) when installing, maintaining or servicing the system.

	WARNING Tear apart and throw away plastic packaging bags so that nobody, especially children, can play with them. Possible risk: suffocation.

	WARNING Do NOT touch the air inlet or aluminium fins of the unit.

	WARNING • Do NOT place any objects or equipment on top of the unit. • Do NOT sit, climb or stand on the unit.

	WARNING During tests, NEVER pressurize the product with a pressure higher than the maximum allowable pressure (as indicated on the nameplate of the unit).

	WARNING • Never mix different refrigerants or allow air to enter the refrigerant system. • Never charge recovered refrigerant from another unit. Use recovered refrigerant only on the same unit where it was recovered from, or have it recycled at a certified facility.

	WARNING: RISK OF BURNING • Do NOT touch the refrigerant piping, water piping or internal parts during and immediately after operation. It could be too hot or too cold. Give it time to return to normal temperature. If you must touch it, wear protective gloves. • Do NOT touch any accidental leaking refrigerant.

WARNING

Always recover the refrigerants. Do NOT release them directly into the environment. Use a vacuum pump to evacuate the installation.

Take sufficient precautions in case of refrigerant leakage. If refrigerant gas leaks, ventilate the area immediately.

Possible risks:

- Excessive refrigerant concentrations in a closed room can lead to oxygen deficiency.
- Toxic gas may be produced if refrigerant gas comes into contact with fire.

Where applicable, pump down the system and close the service valve, before leaving the site if leak was not repaired, to avoid further leaking of the refrigerant.

WARNING: RISK OF ELECTROCUTION

- Turn OFF all power supply before removing the switch box cover, connecting electrical wiring or touching electrical parts. Where applicable, stop the equipment's operation first and allow (refrigerant) pressure to equalize, before turning OFF the power. Disconnect the power supply for more than 1 minute, and measure the voltage at the terminals of main circuit capacitors or electrical components before servicing. The voltage must be less than 50 V DC before you can touch electrical components. For the location of the terminals, refer to "Wiring diagrams" on page 157.
- Do NOT touch electrical components with wet hands.
- Do NOT leave the unit unattended when the service cover is removed.
- Protect electric components from getting wet while the service cover is opened.

WARNING

- Only use copper wires.
- All field wiring must be performed in accordance with the wiring diagram and installation manual supplied with the product.
- If the power cable and lead wires have scratches or deteriorated, be sure to replace them. Damaged cable and wires may cause an electrical shock, excessive heat generation or fire.
- Secure all terminal connections and provide proper routing for cables, both inside and outside the switchbox.
- NEVER squeeze bundled cables and make sure they do not come in contact with the piping and sharp edges.
- Make sure no external pressure is applied to the terminal connections.
- Make sure to check the earth wiring. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Improper earth wiring may cause electrical shock.
- Make sure to use a dedicated power circuit. NEVER use a power supply shared by another appliance.
- Make sure to check the required fuses and/or circuit breakers before starting works.

WARNING

- After finishing the electrical work, confirm that each electrical component and terminal inside the electrical components box is connected securely.
- Make sure all covers are closed before starting the unit again.

2.3. Cautions

CAUTION

Provide adequate measures to prevent that the unit can be used as a shelter by small animals. Small animals that make contact with electrical parts can cause malfunctions, smoke or fire.

CAUTION

- Make sure water quality complies with EU directive 98/83 EC.
- Check the system for leaks after each repair/modification of the water side.
- Check drainage system(s) after repairs.
- Be careful when tilting units as water may leak.

2.4. Information

INFORMATION

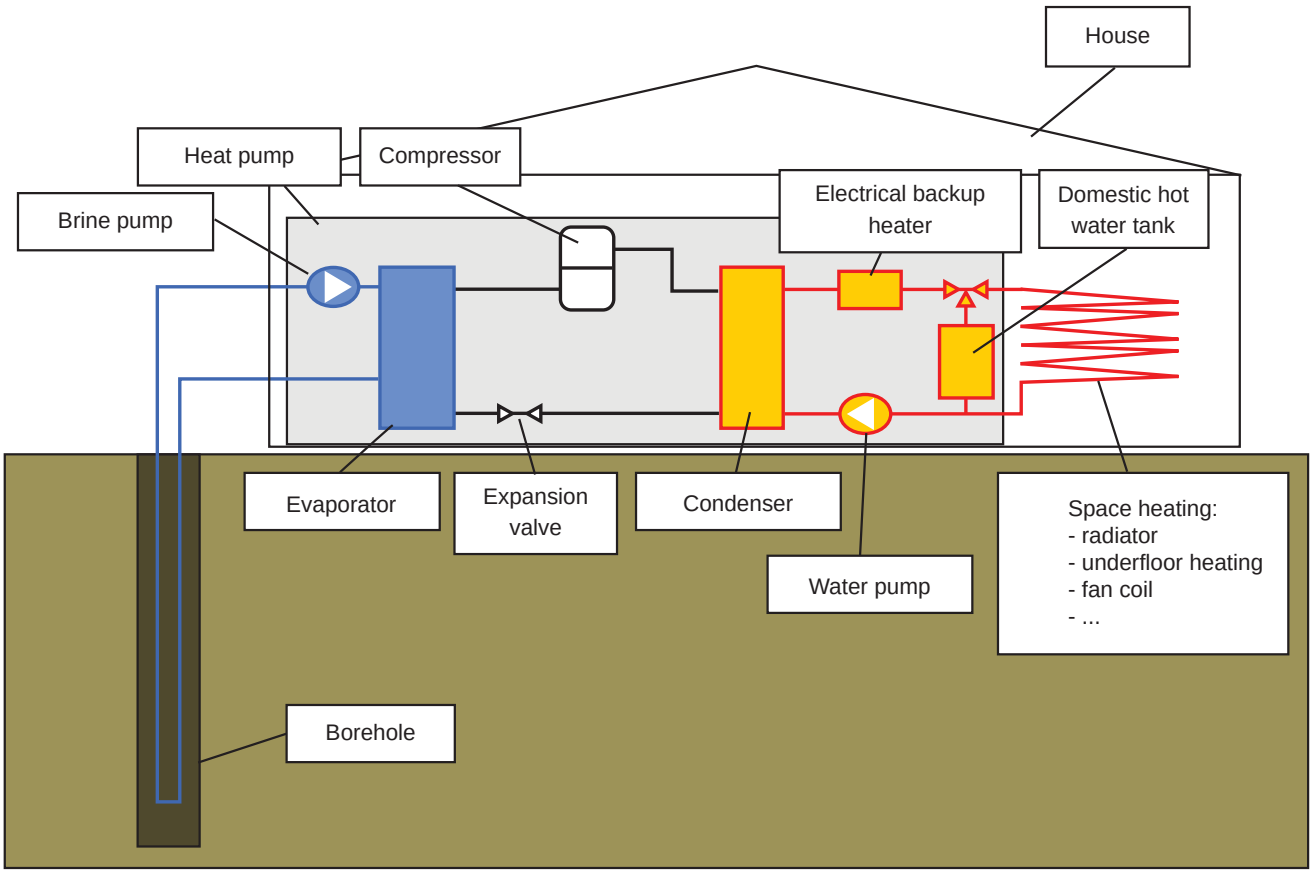
Make sure refrigerant piping installation complies with applicable legislation. In Europe, EN378 is the applicable standard.

INFORMATION

Make sure the field piping and connections are not subjected to stress.

3. General operation of ground source heat pump

The total ground source heat pump system consists out of 3 loops: brine, refrigerant and water. 2 plate heat exchangers transmit the heat from the brine to the refrigerant and from refrigerant to water, which is then used for space heating or domestic hot water.

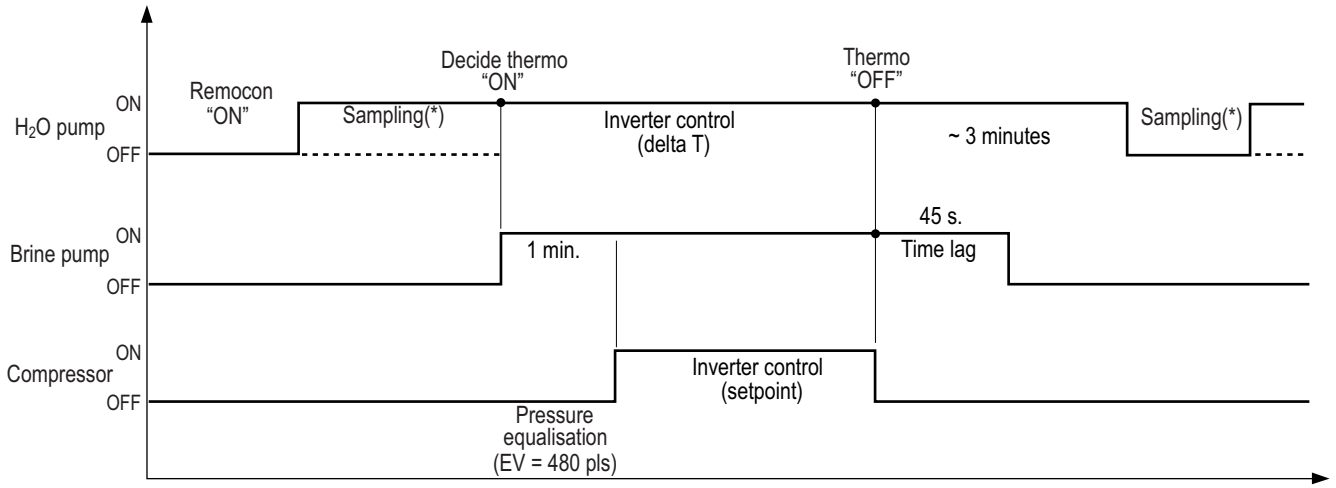


A brine pump and a water pump ensure flow in the brine and water circuit. In the refrigerant circuit, there is a compressor which will increase the pressure and thus increase the temperature of the refrigerant before it's being exchanged with water.

Operation range can be found back in the engineering databook. The requested water temperatures are delivered by heat pump operation and were necessary by assistance of the backup heater.

When the GSHP unit is starting operation, following behaviour occurs:

GROUND SOURCE HEAT PUMP START/STOP CONTROL



(*) H_2O pump sampling operation only in case of leaving water temperature control (not in case of room temperature control).

When space heating thermo on is decided:

- The brine pump will start operating with a continuous speed.
- The inverter water pump will gradually adjust its speed to reach and maintain the required delta T (this is the water temperature difference between the leaving water and entering water (refer to field setting [9-09] in "Field settings" on page 153)).
- The inverter compressor (after pressure equalisation) will gradually adjust its speed to reach and maintain the required water temperature.

When the domestic hot water function is activated, the 3-way valve will switch over to the domestic hot water tank and space heating side is closed. Domestic hot water and space heating cannot be active simultaneously. The 3-way valve will switch back to space heating when domestic hot water setpoint is reached or when running timers are finished (refer to the Installer Reference Guide for more details).

When the unit receives a thermo off signal:

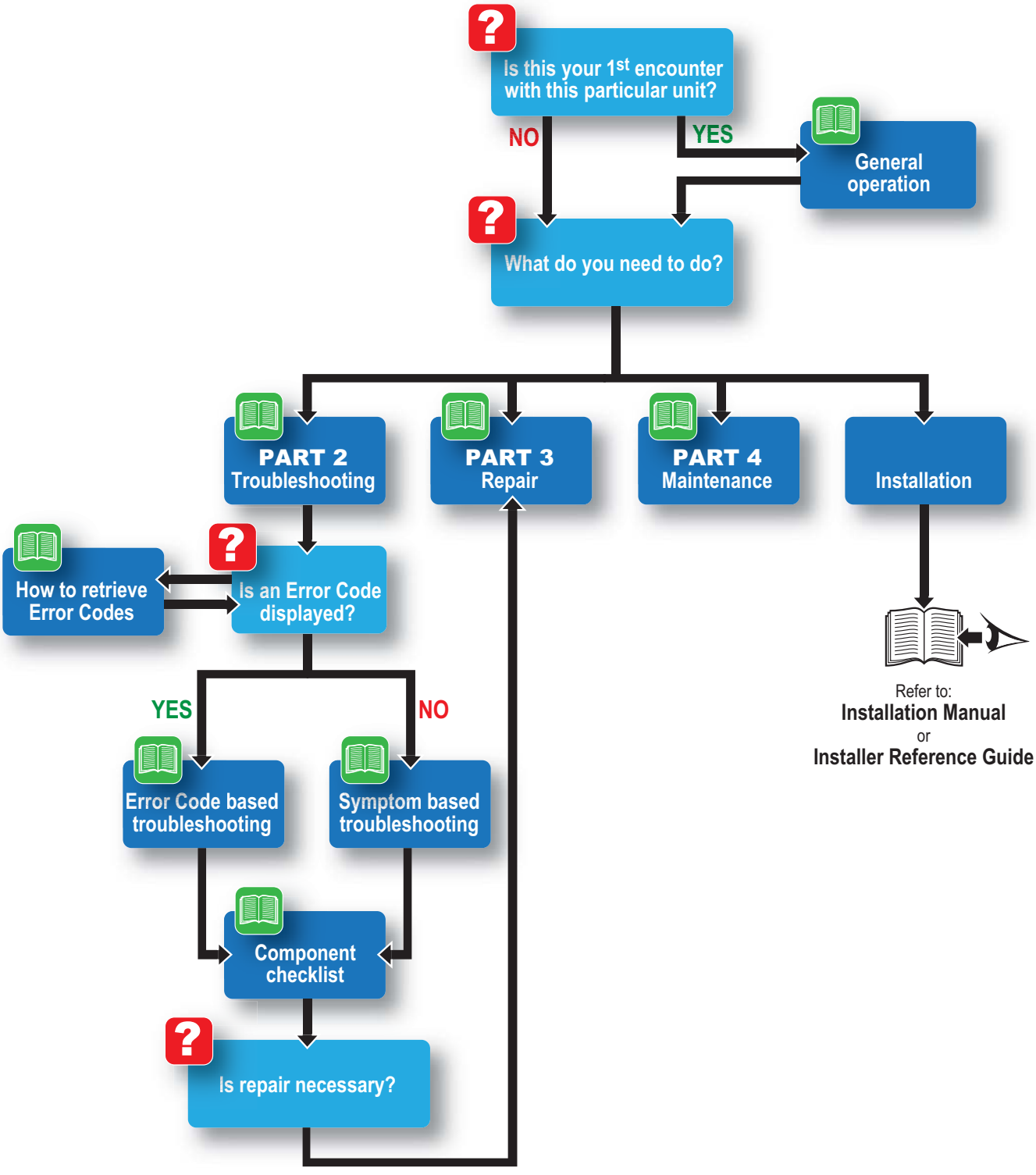
- The compressor will stop its operation.
- The brine pump will operate for another 45 seconds (pressure equalization) and eventually stop.
- The water pump will operate for some minutes and eventually stop or start sampling.

4. How to use this book

4.1. Interactive information flow

This Daikin product Service Manual is intended for professional use only. The actions described hereafter, are only to be performed by qualified and certified persons, taking into account the safety precautions mentioned in this manual and the local regulations as well.

By following the diagram below, the reader can find the relevant information related to his/her task. The digital (pdf) version of this book allows direct page access through all active links. When Adobe Acrobat Reader is used, the <Alt> + <Back Arrow> keys can be used to return to the previously viewed page.



4.2. Parts of the book

This Daikin product Service Manual is intended for professional use only. The actions described hereafter, are only to be performed by qualified and certified persons, taking into account the safety precautions mentioned in this manual and the local regulations as well.

As can be observed from the Table of Contents, this manual is split up into several chapters:

4.2.1. The introduction chapter

The chapter "Introduction" on page 9 includes the safety precautions, this topic and the general operation description of the product(s) this manual refers to.

4.2.2. The troubleshooting chapter

The chapter "Troubleshooting" on page 17 not only deals with the methods to recognize and resolve occurring error codes; it also describes the methods how to solve a problem that does not immediately trigger an error code. Such problems are referred to as 'symptom based'. Both the error code based and symptom based troubleshooting tables, indicate possible causes, the necessary checks and in case required, how to repair. The possible causes have been sorted to probability of occurrence and speed of execution.

4.2.3. The repair chapter

The chapter "Repair" on page 81 handles the removal and replacement of the major components in the product and discusses cleaning methods as well if applicable, such as for filters. Where applicable, refrigerant handling precautions are mentioned for certain actions; please consider these carefully for your own safety.

4.2.4. The maintenance chapter

The chapter "Maintenance" on page 147 of this manual describes the maintenance intervals and procedures to be performed on the product. Remember that a well maintained product, is a more reliable and efficient product.

4.2.5. Appendices

Finally, the service manual provides in chapter "Appendix" on page 153 valuable reference data such as piping/wiring diagrams, field settings overview and a checklist to be filled in when you need to escalate an issue to your dealer.

4.3. Contact information

This manual has been made with much care and effort. Use it in your daily jobs, as it has been made for you.

Despite our efforts, there is always a chance some cleric or other mistake has been made during the creation of this manual. We kindly ask you to send the found mistakes, or remarks for improvement, to the no-reply email address servicemanual@daikineurope.com.

Part 2. Troubleshooting

This part contains the following chapters:

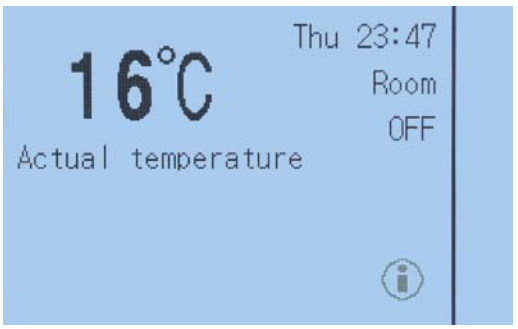
1. Error codes 17	3. Symptom based troubleshooting 36
2. Error code based troubleshooting.....20	4. Component checklist..... 53

1. Error codes

1.1. How to retrieve error codes

When a problem happens, an error code appears on the user interface. It is important to understand the problem and to take countermeasure before resetting the error code.

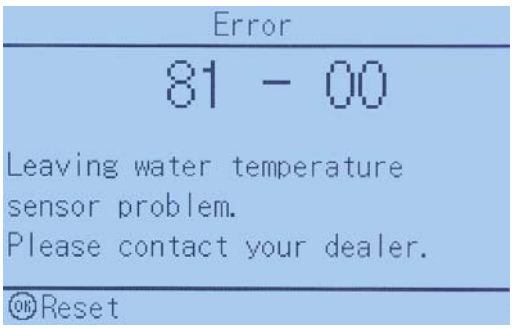
If an error is present, it will immediately be displayed on the user interface screen. In case of a warning, the i-symbol (information) will be blinking:



You can see the error code by pressing the i-button.

Now you can read the error code and a short indication about the problem.

For more information about troubleshooting, refer to "Error code based troubleshooting" on page 20.



1.2. How to reset error codes

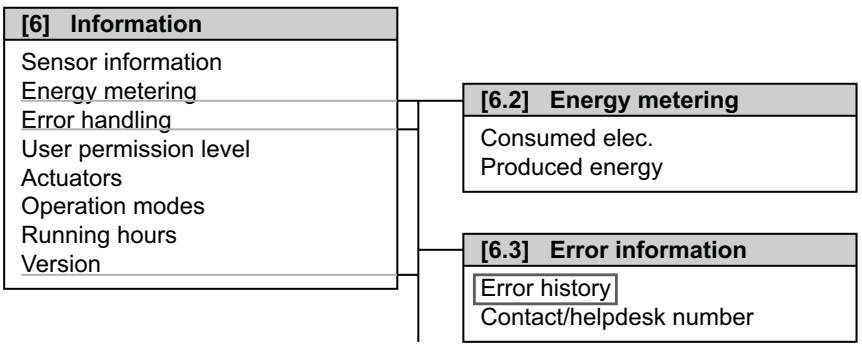
When the problem is solved, you can reset the error by pushing the OK-button unless otherwise mentioned on the screen.

> **INFORMATION**
> For U3 error for example, you need to be in installer mode to reset.

1.3. History of error codes

The user interface can remember up to 20 error codes.

They can be found on the following location:



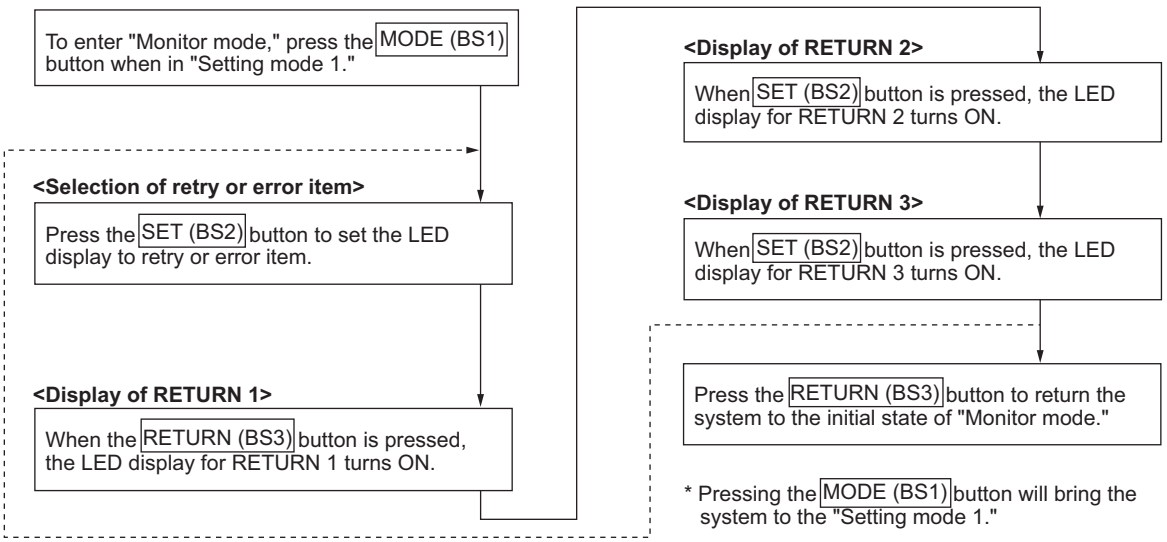
1.4. Content of retry

Through the outdoor PCB, the content of retry can be determined.

Here, you can find the errors which are being created before they are being displayed on the user interface.

Content of retry goes back up to 3 retries.

Take the following steps to check contents of retry and error.



Data display (1)

Display contents	LED display						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P
In normal operation	◑	●	●	●	●	●	●
In oil return operation	◑	●	●	●	●	●	◑

Data display (2)

Display contents	LED display						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P
GSHP	◑	●	●	●	◑	◑	◑

Data display (3)

Display contents	LED display						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P
Normal (not in stepping-down operation)	◑	●	●	●	●	●	◑
Low pressure stepping-down	◑	●	●	●	●	◑	●
High pressure stepping-down	◑	●	●	●	●	◑	◑
Inverter discharge pipe stepping-down	◑	●	●	●	◑	●	●
Inverter current stepping-down	◑	●	●	●	◑	●	◑
Radiation fin temperature stepping-down	◑	●	●	●	◑	◑	●
Inverter stepping-down	◑	●	●	●	◑	◑	◑
Overall current stepping-down	◑	●	●	◑	●	●	●
Other stepping-down	◑	●	●	◑	●	●	◑

2. Error code based troubleshooting

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2.1. "AA" – Back up heater safety error

Trigger	Effect	Reset
Thermal protector Q1L is activated (temp > 92°C).	Unit will stop operating.	Power reset + reset via user interface + pressing the button on the Q1L (if activated).

Possible cause	Check	Corrective action
Air in water circuit / backup heater.	Check if all air purge valves are open. Check if air purge valves are installed on all highest points of the field installed water circuit.	Purge air out of unit and field supplied water system and BUH. Refer to the Installer Reference Guide.
Increased water temperature by external heat source.	Check if another heat source is installed on the same water circuit.	Correct hydraulic field circuit. Refer to the Installer Reference Guide.
Faulty thermal protector Q1L / hydro PCB A1P.	Check thermal protector backup heater Q1L (see page 72).	Replace thermal protector backup heater Q1L (see page 107) or hydro PCB A1P (see page 91).
Faulty thermistor R2T (after backup heater) / hydro PCB A1P.	Check thermistor R2T (see page 57).	Replace thermistor R2T (see page 141) or hydro PCB A1P (see page 91).
Faulty thermistor R1T (leaving water) / hydro PCB A1P.	Check thermistor R1T (see page 57).	Replace thermistor R1T (see page 141) or hydro PCB A1P (see page 91).
Faulty backup heater assy / hydro PCB A1P.	Check backup heater (see page 53).	Replace the faulty components (backup heater (see page 104) or hydro PCB A1P (see page 91).

2.2. "AH" – Disinfection operation error

Trigger	Effect	Reset
Disinfection setpoint is not reached or not kept for requested time.	Unit will continue operating.	Auto-reset when next disinfection is completed.

Possible cause	Check	Corrective action
Large hot water quantity has been tapped during / before disinfection.	Check when the disinfection is scheduled (schedule it when there is little chance that water will be tapped so that the disinfection can finish in time).	Adjust schedule timer and/or related settings. Refer to the Installer Reference Guide.
Backup heater is restricted during disinfection.	Check the backup heater settings [2-00] till [2-04]. Refer to the Installer Reference Guide.	Adjust related settings. Refer to the Installer Reference Guide.
Faulty water tank thermistor R5T / hydro PCB A1P.	Check thermistor R5T (see page 57).	Replace thermistor R5T (see page 141) or hydro PCB A1P (see page 91).

2.3. "A1" – Hydro PCB abnormality

Trigger	Effect	Reset
Hydrobox PCB A1P detects EEPROM is abnormal.	Unit will stop operating.	Via power reset + via user interface.

Possible cause	Check	Corrective action
Faulty hydro PCB A1P.	Check if the alive led is blinking in regular intervals.	If not blinking in regular intervals, replace the PCB A1P (see page 91).

2.4. "CJ-02" – User interface room temperature error

Trigger	Effect	Reset
Room temperature thermistor of user interface detects an abnormal value (open or short circuit).	Unit will keep operating.	Auto-reset.

Possible cause	Check	Corrective action
Faulty room thermistor of user interface.	Check room thermistor read out value via the user interface and compare with actual room temperature.	Replace user interface or replace hydro PCB A1P (see page 91).

2.5. "C0" – Flow sensor error

Trigger	Effect	Reset
Flow sensor still detects a water flow after 45 seconds when pump has stopped.	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Water flow caused by external pump.	Check if another (external) pump is installed on the same water circuit.	Correct hydraulic field circuit. Refer to the Installer Reference Guide.
Faulty flow sensor / hydro PCB A1P.	Check flow sensor (see page 76).	Replace flow sensor (see page 102) or replace hydro PCB A1P (see page 91). If flow sensor failed due to contamination, check for source of contamination and consider to install an additional water filter.

2.6. "C4" – Refrigerant liquid thermistor R3T (A1P) abnormality

Trigger	Effect	Reset
Thermistor detects an abnormal value (open or short circuit).	Unit will stop operating.	Auto-reset when problem is solved.

Possible cause	Check	Corrective action
Faulty refrigerant liquid thermistor R3T (A1P) / hydro PCB A1P.	Check thermistor R3T (see page 57).	Replace thermistor R3T (see page 141) or hydro PCB (see page 91).

2.7. "EC" – Domestic hot water temperature error

Trigger	Effect	Reset
R5T (A1P) (water tank thermistor) detects temperature above 89°C.	Unit will continue operating.	Auto-reset when trouble is solved.

Possible cause	Check	Corrective action
Increased water temp by external heat source.	Check if another heat source is installed on the same water circuit.	Correct hydraulic field circuit. Refer to the Installer Reference Guide.
Faulty water tank thermistor R5T / hydro PCB A1P.	Check thermistor R5T (see page 57).	Replace thermistor R5T (see page 141) or hydro PCB A1P (see page 91).

2.8. "E1" – Refrigerant/brine PCB abnormality

Trigger	Effect	Reset
Refrigerant/brine PCB A9P detects EEPROM is abnormal.	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Faulty refrigerant/brine PCB A9P.	Check if the alive led is blinking in regular intervals.	If not blinking in regular intervals, replace the PCB.
External factor (e.g. electrical noise) (cause when error is reset after power reset, and error happens again after awhile).	Check for source which could cause electrical interference.	

2.9. "E3" – High pressure abnormality

Trigger	Effect	Reset
1. High pressure switch opens due to pressure > 41,7 bar. 2. High pressure control (HP > 38 bar) occurs 16 times within 300 minutes.	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Refrigerant overcharge.	Check for refrigerant overcharge.	Charge the correct refrigerant amount (1.8 kg).
Humidity in refrigerant (ice formation in expansion valve).	Check for humidity in the refrigerant.	In case of suspicion of humidity recover, vacuum and recharge with virgin refrigerant.
Non condensables in refrigerant.	Check for non condensables in refrigerant.	In case of suspicion of non condensables recover, vacuum and recharge with virgin refrigerant.
Refrigerant circuit is clogged.	Check for possible blockage (blockages can be checked by measuring the refrigerant/pipe temperature. Sudden drop in temperature could indicate a blockage (remark: this is not valid for the expansion valve)).	
Faulty high pressure sensor / refrigerant/brine PCB A9P.	Check high pressure sensor (see page 69).	Replace the high pressure sensor (see page 135) or PCB A9P (see page 94).
Faulty high pressure switch / inverter PCB A10P.	Check high pressure switch (see page 70).	Replace the high pressure switch (see page 138) or the inverter PCB A10P (see page 95).

2.10. "E5" – Compressor motor lock

Trigger	Effect	Reset
The motor rotor does not rotate when the compressor is energized.	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Refrigerant circuit is clogged (HP - LP > 0,26 MPa).	Check for possible blockage (blockages can be checked by measuring the refrigerant/pipe temperature. Sudden drop in temperature could indicate a blockage (remark: this is not valid for the expansion valve)).	
Faulty compressor.	Check compressor (see page 68).	Replace compressor and also investigate reason of breakdown. Check expansion valve operation (liquid back issue). Check refrigerant shortage (overheated issue) -> check for leak.

2.11. "E7" – Brine flow error

Trigger	Effect	Reset
Brine flow is below 25 l/min for 15 seconds (when having low brine temp (< 0°C) at start up the trigger timer can increase up to 60 seconds).	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Closed valve in brine circuit.	Check if all valves are open.	Adjust / open valve.
Brine pressure is too low.	Check the brine pressure on the pressure gauge (PG1).	Increase brine pressure till ~2 bar. Refer to the Installer Reference Guide. Check for possible brine leak.
Static pressure of brine circuit is too high.	Check the static pressure of the brine circuit.	Correct brine field circuit. Refer to the Installer Reference Guide or to the Data Book (for pump characteristics).
Brine field piping is blocked.	Check for possible blockage (blockages can be checked by measuring the refrigerant/pipe temperature. Sudden drop in temperature could indicate a blockage (remark: this is not valid for the expansion valve)).	
Brine filter is blocked.	Check brine filter.	Clean brine filter (see page 96). Check brine quality and possible source of dirt.
Faulty flow switch / refrigerant/brine PCB A9P.	Check flow switch (see page 62).	Replace flow switch (see page 100) or replace PCB A9P (see page 94). If flow switch failed due to contamination, check for source of contamination and consider to install an additional filter.
Faulty brine pump / refrigerant/brine PCB A9P.	Check brine pump (see page 63).	Replace brine pump (see page 103) or replace PCB A9P (see page 94). If brine pump failed due to contamination, check for source of contamination and consider to install an additional filter.

2.12. “E9” – Expansion valve abnormality

Trigger	Effect	Reset
1. No continuity of expansion valve. 2. Minimum expansion valve opening and suction superheat < 4 K and discharge superheat < 5 K.	Unit will stop operating.	Via user interface (power reset might be necessary in case no common power supply was cause).

Possible cause	Check	Corrective action
No common power supply after power on.	Check power supply.	
Faulty expansion valve.	Check expansion valve (see page 71).	Replace expansion valve (see page 131, page 133).
Faulty thermistor R2T, R3T, R4T / refrigerant/brine PCB A9P.	Check thermistors R2T, R3T, R4T (see page 57).	Replace thermistors R2T, R3T, R4T (see page 141) or PCB A9P (see page 94).
Faulty high pressure sensor / refrigerant/brine PCB A9P.	Check high pressure sensor (see page 69).	Replace the high pressure sensor (see page 138) or PCB A9P (see page 94).
Wet operation.	Check for wet operation. (Wet operation can be detected by checking the suction superheat. If the suction superheat is 0°C then liquid refrigerant is returning to the compressor.)	In case wet operation was detected confirm the cause: • Refrigerant overcharge. • Restricted brine flow. • Faulty expansion valve.
External factor (e.g. electrical noise) (cause when error is reset after power reset, and error happens again after awhile).	Check for source which could cause electrical interference.	

2.13. "F3" – Discharge pipe temperature control

Trigger	Effect	Reset
1. Discharge temperature > 110°C for 15 minutes. 2. Discharge temperature > 125°C.	Unit will stop operating.	Via user interface -> only possible when below 95°C.

Possible cause	Check	Corrective action
Refrigerant shortage (incorrect charge / leakage).	Check for refrigerant shortage. Perform leak test.	Repair the leak and charge the correct amount of refrigerant (1.8 kg).
Faulty thermistor R2T / refrigerant/brine PCB A9P.	Check thermistor R2T (see page 57).	Replace thermistor R2T (see page 141) or PCB A9P (see page 94).
Faulty compressor.	Check compressor (see page 68).	Replace compressor and also investigate reason of breakdown. Check expansion valve operation (liquid back issue). Check refrigerant shortage (overheated issue) -> check for leak.

2.14. "HC" – Domestic hot water temperature error

Trigger	Effect	Reset
R5T (A1P) detects abnormal value (open or short circuit).	Unit will keep operating.	Auto reset when problem is solved.

Possible cause	Check	Corrective action
Faulty water tank thermistor R5T / hydro PCB A1P.	Check thermistor R5T (see page 57).	Replace thermistor R5T (see page 141) or hydro PCB A1P (see page 91).

2.15. "H0-01" – Brine flow switch error

Trigger	Effect	Reset
Brine flow switch detects flow after 45 seconds pump has stopped.	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Brine flow caused by external pump.	Check if another (external) pump is installed within the brine circuit.	Correct brine field circuit to assure that the field supplied brine pump does not influence the units internal brine flow or that it is stopped when the unit brine pump is stopped.
Faulty flow switch / refrigerant/brine PCB A9P.	Check flow switch(see page 62).	Replace flow switch (see page 100) or replace PCB A9P (see page 94). If flow switch failed due to contamination, check for source of contamination and consider to install an additional filter.

2.16. "H1" – Optional temperature sensor error (indoor ambient)

Trigger	Effect	Reset
Optional thermistor detects an abnormal value (open or short circuit).	Unit will keep operating.	Auto reset when problem is solved.

Possible cause	Check	Corrective action
Faulty option thermistor R6T / hydro PCB A1P.	Check thermistor R6T (see page 57).	Replace thermistor R6T (see page 141) or hydro PCB A1P (see page 91).

2.17. "H3" – High pressure switch system abnormality

Trigger	Effect	Reset
High pressure switch is activated when compressor is off.	Unit stops operating.	Via user interface.

Possible cause	Check	Corrective action
Faulty high pressure switch / inverter PCB A10P.	Check high pressure switch (see page 69).	Replace the high pressure switch (see page 138) or the inverter PCB A10P (see page 95).

2.18. "H9" – Outdoor air thermistor (R1T) abnormality

Trigger	Effect	Reset
Thermistor detects an abnormal value (open or short circuit).	Unit stops operating.	Auto-reset when problem is solved.

Possible cause	Check	Corrective action
Faulty outdoor air thermistor R1T / refrigerant/brine PCB A9P.	Check thermistor R1T (see page 57). (Remark: also check the LC filter connection between the X5M terminal and the PCB A9P.)	Replace thermistor R1T (see page 141) or PCB A9P (see page 94).

2.19. "J1" – High pressure sensor abnormality

Trigger	Effect	Reset
High pressure sensor detects an abnormal value for 3 minutes (> 4,5 MPa or < -0,05 MPa).	Unit stops operating.	Auto-reset.

Possible cause	Check	Corrective action
Faulty high pressure sensor / refrigerant/brine PCB A9P.	Check high pressure sensor (see page 69).	Replace the high pressure sensor (see page 138) or PCB A9P (see page 94).

2.20. "J3" – Discharge thermistor abnormality

Trigger	Effect	Reset
Discharge thermistor detects an abnormal value (open or short circuit).	Unit stops operating.	Auto-reset when problem is solved.

Possible cause	Check	Corrective action
Faulty discharge thermistor (R2T) / refrigerant/brine PCB A9P.	Check thermistor R2T (see page 57).	Replace thermistor R2T (see page 141) or PCB A9P (see page 94).

2.21. "J5" – Suction thermistor (R3T) abnormality

Trigger	Effect	Reset
Suction thermistor detects an abnormal value (open or short circuit).	Unit stops operating.	Auto-reset when problem is solved.

Possible cause	Check	Corrective action
Faulty suction thermistor (R3T) / refrigerant/brine PCB A9P.	Check thermistor R3T (see page 57).	Replace thermistor R3T (see page 141) or PCB A9P (see page 94).

2.22. "J6" – Heat exchanger refrigerant inlet thermistor (R4T) abnormality

Trigger	Effect	Reset
Heat exchanger refrigerant inlet thermistor detects an abnormal value (open or short circuit).	Unit stops operating.	Auto-reset when problem is solved.

Possible cause	Check	Corrective action
Faulty heat exchanger refrigerant inlet thermistor (R4T) / refrigerant/brine PCB A9P.	Check thermistor R4T (see page 57).	Replace thermistor R4T (see page 141) or PCB A9P (see page 94).

2.23. "J7" – Brine inlet thermistor (R5T) abnormality

Trigger	Effect	Reset
Brine inlet thermistor (R5T) detects an abnormal value (open or short circuit).	Unit stops operating.	Auto-reset when problem is solved.

Possible cause	Check	Corrective action
Faulty brine inlet thermistor (R5T) / refrigerant/brine PCB A9P.	Check thermistor R5T (see page 57).	Replace thermistor R5T (see page 141) or PCB A9P (see page 94).

2.24. "J8" – Brine outlet thermistor (R6T) abnormality

Trigger	Effect	Reset
Brine outlet thermistor (R6T) detects an abnormal value (open or short circuit).	Unit stops operating.	Auto-reset when problem is solved.

Possible cause	Check	Corrective action
Faulty brine outlet thermistor (R6T) / refrigerant/brine PCB A9P.	Check thermistor R6T (see page 57).	Replace thermistor R6T (see page 141) or PCB A9P (see page 94).

2.25. "LC" – Transmission system abnormality

Trigger	Effect	Reset
No transmission between refrigerant/brine PCB A9P and inverter PCB A10P.	Unit stops operating.	Auto-reset.

Possible cause	Check	Corrective action
Internal wiring is not OK (A9P <-> A10P).	Check if wiring between PCB A9P and inverter PCB A10P is correct (refer to wiring diagram).	Correct wiring.
Faulty refrigerant/brine PCB A9P.	Check if the alive led is blinking in regular intervals.	If not blinking in regular intervals, replace the PCB A9P (see page 94).
Faulty inverter PCB A10P.	Check inverter PCB A10P (see page 74).	If faulty replace inverter PCB A10P (see page 95).
External factor (e.g. electrical noise) (cause when error is reset after power reset, and error happens again after awhile).	Check for source which could cause electrical interference.	

2.26. "LH" – Converter attention

Trigger	Effect	Reset
Current sensor on refrigerant/brine PCB A9P is broken.	Unit will continue operating.	Auto-reset.

Possible cause	Check	Corrective action
Faulty PCB A9P.		Replace PCB A9P (see page 94).

2.27. "L1" – Refrigerant/brine PCB abnormality

Trigger	Effect	Reset
Refrigerant/brine PCB detects current / voltage errors.	Unit will stop operating.	Via user interface (power reset might be required).

Possible cause	Check	Corrective action
Power supply is not OK -> imbalance > 10%.	Check power supply for voltage fluctuations (> 10%).	Voltage fluctuations should be less than 10%.
Compressor wiring is not OK.	Check connection of the compressor UVW wiring (see page 117).	Correct the UVW wiring (see page 117).
Faulty refrigerant/brine PCB A9P.	Check if the alive led is blinking in regular intervals.	If not blinking in regular intervals, replace the PCB (see page 94).
External factor (e.g. electrical noise) (cause when error is reset after power reset, and error happens again after awhile).	Check for source which could cause electrical interference.	

2.28. "L4" – Radiation fin temperature abnormality

Trigger	Effect	Reset
Inverter PCB detects fin temperature above 85°C.	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Bad connection heat sink to inverter PCB.	Check connection between refrigerant piping and heat sink of inverter PCB.	Restore thermal connection between thermistor and heat sink (see page 143).
Faulty thermistor R10T / inverter PCB A10P.	Check thermistor R10T (see page 57).	Replace thermistor R10T (see page 143) or inverter PCB A10P (see page 95).
Refrigerant shortage (incorrect charge / leakage).	Check for refrigerant shortage. Perform leak test.	If required repair the leak and charge the correct amount of refrigerant (1.8 kg).

2.29. "L5" – Output overcurrent detection

Trigger	Effect	Reset
Inverter PCB detects overcurrent to power transistor.	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Refrigerant circuit is clogged.	Check for possible blockage (blockages can be checked by measuring the refrigerant/pipe temperature. Sudden drop in temperature could indicate a blockage (remark: this is not valid for the expansion valve)).	
Power supply is not OK (voltage drop).	Check power supply for voltage dips.	
Faulty compressor.	Check compressor (see page 68).	Replace compressor (see page 117).
Faulty inverter PCB A10P.	Check inverter PCB (see page 74).	Replace inverter PCB (see page 95).

2.30. "L8" – Electronic thermal overload

Trigger	Effect	Reset
When compressor overload (except during startup) is detected.	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Refrigerant circuit is clogged.	Check for possible blockage (blockages can be checked by measuring the refrigerant/pipe temperature. Sudden drop in temperature could indicate a blockage (remark: this is not valid for the expansion valve)).	
Refrigerant overcharge.	Check for refrigerant overcharge.	Charge the system with 1.8 kg refrigerant.
Faulty compressor.	Check compressor (see page 68).	Replace compressor (see page 117).
Faulty inverter PCB A10P.	Check inverter PCB (see page 74).	Replace inverter PCB (see page 95).

2.31. "L9" – Stall prevention (time lag)

Trigger	Effect	Reset
Inverter PCB detects compressor overload at start up.	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Refrigerant circuit is clogged.	Check for possible blockage (blockages can be checked by measuring the refrigerant/pipe temperature. Sudden drop in temperature could indicate a blockage (remark: this is not valid for the expansion valve)).	
Refrigerant condition is not OK (HP - LP > 0,2 MPa at start up).	Check refrigerant condition.	
Faulty compressor.	Check compressor (see page 68).	Replace compressor (see page 117).
Faulty inverter PCB A10P.	Check inverter PCB (see page 74).	Replace inverter PCB (see page 95).

2.32. "P1" – Open phase or power supply voltage imbalance

Trigger	Effect	Reset
Inverter PCB detects incorrect power supply.	Unit will stop operating.	Auto-return.

Possible cause	Check	Corrective action
Power supply is not OK -> open phase.	Check the power supply.	
Power supply is not OK -> imbalance > 10% (rated power supply: 400 V).	Check power supply for voltage fluctuations (> 10%).	Voltage fluctuations should be less than 10%.
Faulty inverter PCB A10P.	Check inverter PCB (see page 74).	Replace inverter PCB (see page 95).

2.33. "P4" – Inverter radiation fin thermistor (R10T) error

Trigger	Effect	Reset
Thermistor R10T detects an abnormal value (open or short circuit).	Unit will stop operating.	Auto-reset when problem is solved.

Possible cause	Check	Corrective action
Faulty inverter heat sink thermistor R10T / inverter PCB A10P.	Check thermistor R10T (see page 57) Check inverter PCB (see page 74).	Replace thermistor R10T (see page 143) or PCB A10P (see page 95).

2.34. "PJ" – Defective capacity setting

Trigger	Effect	Reset
Refrigerant/brine PCB detects a defective capacity in EEPROM.	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Positions of PCB dipswitches are not OK.	Check if dipswitches are set to default (OFF) position.	
Faulty refrigerant/brine PCB A9P.	Check if the alive led is blinking in regular intervals.	If not blinking in regular intervals, replace the PCB A9P.

2.35. "UA" – PCB combination error

Trigger	Effect	Reset
System detects combination mismatch between refrigerant/brine PCB and hydro PCB or inverter PCB.	Unit will stop operating.	Auto-reset.

Possible cause	Check	Corrective action
Faulty inverter PCB A10P.	Check if the correct spare part PCB was installed.	Replace PCB when required (see page 95).
Faulty refrigerant/brine PCB A9P.	Check if the correct spare part PCB was installed.	Replace PCB when required (see page 94).
Faulty hydro PCB A1P.	Check if the correct spare part PCB was installed.	Replace PCB when required (see page 91).

2.36. "U0" – Refrigerant shortage

Trigger	Effect	Reset
1. Refrigerant/brine PCB detects maximum opening expansion valve and discharge superheat > 50°C for 5 minutes. 2. 4 times a secondary current drop for 5 minutes (unit goes thermo off after every drop).	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Refrigerant circuit is clogged.	Check for possible blockage (blockages can be checked by measuring the refrigerant/pipe temperature. Sudden drop in temperature could indicate a blockage (remark: this is not valid for the expansion valve)).	
Refrigerant shortage (incorrect charge / leakage).	Check for refrigerant shortage. Perform leak test.	If required repair the leak and charge the correct amount of refrigerant (1.8 kg).
Faulty expansion valve.	Check expansion valve (see page 71).	Replace expansion valve (see page 131, page 133) or PCB A9P (see page 94).
Faulty high pressure sensor / refrigerant/brine PCB A9P.	Check high pressure sensor (see page 69).	Replace the high pressure sensor (see page 135) or PCB A9P (see page 94).

2.37. "U1" – Reverse phase or open phase

Trigger	Effect	Reset
Refrigerant/brine PCB detects incorrect power supply.	Unit will stop operating.	Via user interface + power reset.

Possible cause	Check	Corrective action
Power supply is not OK -> open phase.	Check power supply.	
Power supply is not OK -> reverse phase.	Check power supply.	Change two phases with each other.
Faulty refrigerant/brine PCB A9P.	Check if the correct spare part PCB A9P was installed.	Replace PCB A9P when required (see page 94).

2.38. "U2" – Power supply voltage abnormality

Trigger	Effect	Reset
Inverter PCB detects an abnormal power supply (drop or peak).	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Power supply is not OK -> imbalance > 10% (rated power supply: 400 V).	Check power supply for voltage fluctuations (> 10%).	Voltage fluctuations should be less than 10%.
Power supply is not OK -> reverse phase.	Check power supply.	Change two phases with each other.
Faulty inverter PCB A10P.	Check inverter PCB A10P (see page 74).	Replace inverter PCB A10P (see page 95).

2.39. "U3-00" – Abnormal stop of underfloor heating dry-out scheduled operation

Trigger	Effect	Reset
Screed dry-out program was interrupted.	Unit will stop UFH dry-out schedule.	Via user interface -> only possible in "installer" level.

Possible cause	Check	Corrective action
User interface has been turned off.	Check user interface.	Restart screed dry out program. Refer to the Installer Reference Guide.
Power failure.	Check power supply.	Restart screed dry out program. Refer to the Installer Reference Guide.

2.40. "U4" – Defective indoor-outdoor transmission

Trigger	Effect	Reset
Hydro PCB detects abnormal transmission to refrigerant/brine PCB for a certain time.	Unit will stop operation.	Auto-reset.

Possible cause	Check	Corrective action
Power supply is not OK -> imbalance > 10% (rated power supply: 400 V).	Check power supply for voltage fluctuations (> 10%).	Voltage fluctuations should be less than 10%.
Wiring between refrigerant/brine PCB A9P and hydro PCB A1P is not OK.	Check the wiring (refer to the wiring diagram).	Correct the wiring.
Faulty refrigerant/brine PCB A9P.		Replace PCB A9P (see page 94).
Faulty hydro PCB A1P.		Replace PCB A1P (see page 91).
External factor (e.g. electrical noise) (cause when error is reset after power reset, and error happens again after awhile).	Check for source which could cause electrical interference.	

2.41. "U5-00" – Transmission error between user interface and hydro PCB

Trigger	Effect	Reset
Hydro PCB detects abnormal transmission to user interface for a certain time.	Unit will stop operation.	Auto-reset.

Possible cause	Check	Corrective action
Both user interfaces are set to the same "user interface location" (in room / at unit) (only applicable when 2 user interfaces are connected to 1 unit).	Check setting [A.2.1.B] on both user interfaces.	Correct user interface location via setting [A.2.1.B].
Faulty user interface.		Replace user interface.
Faulty hydro PCB A1P.		Replace PCB A1P (see page 91).
External factor (e.g. electrical noise) (cause when error is reset after power reset, and error happens again after awhile).	Check for source which could cause electrical interference.	

2.42. "7H-01" – Water flow abnormality

Trigger	Effect	Reset
Flow sensor detects a water flow below 7 l/min for 15 seconds.	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Closed valve in water circuit.	Check if all valves are open.	Adjust / open valve.
Water pressure is too low.	Check the water pressure on the pressure gauge (PG2).	Increase water pressure till ~ 2 bar. Refer to the Installer Reference Guide. Check for possible water leak.
Air in water circuit / unit.	Check if all air purge valves are open. Check if air purge valves are installed on all highest points of the field installed water circuit.	Purge air out of unit and field supplied water system and BUH. Refer to the Installer Reference Guide.
Static pressure of water circuit is too high.	Check the system design and determine static pressure of the water circuit (for each loop).	Correct hydraulic field circuit (e.g. use of balancing bottle). Refer to the Installer Reference Guide or to the Data Book (for pump characteristics).
Water filter is blocked.	Check water filter.	Clean water filter (see page 98). Check water quality and possible source of dirt.
Faulty 3-way valve.	Check 3-way valve (see page 78).	Replace 3-way valve (see page 123) and (see page 126).
Faulty flow sensor / hydro PCB A1P.	Check flow sensor (see page 76).	Replace flow sensor (see page 102) or replace hydro PCB A1P (see page 91). If flow sensor failed due to contamination, check for source of contamination and consider to install an additional water filter.
Faulty water pump / hydro PCB A1P.	Check water pump (see page 65).	Replace water pump (see page 113) or replace hydro PCB A1P. If flow sensor failed due to contamination, check for source of contamination and consider to install an additional water filter.
TIP: Check if problem also happens in short water circuit (for example domestic hot water circuit).		

2.43. "8F" – Backup heater outlet water temperature error during domestic hot water operation

Trigger	Effect	Reset
R2T (A1P) detects temperature above 75°C during domestic hot water operation.	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Increased water temp by external heat source.	Check if another heat source is installed on the same water circuit.	Correct hydraulic field circuit. Refer to the Installer Reference Guide.
Faulty thermistor R2T / hydro PCB A1P.	Check thermistor R2T (see page 57).	Replace thermistor R2T (see page 141) or hydro PCB A1P (see page 91).
Faulty backup heater contactors (sticking) K1M, K2M or hydro PCB A1P.	Check backup heater control contactors K1M, K2M (see page 53).	Replace the contactor(s) K1M, K2M.

2.44. "8H" – Backup heater outlet water temperature error

Trigger	Effect	Reset
R2T (A1P) (thermistor after backup heater) detects temperature above 75°C.	Unit will stop operating.	Via user interface.

Possible cause	Check	Corrective action
Increased water temp by external heat source.	Check if another heat source is installed on the same water circuit.	Correct hydraulic field circuit. Refer to the Installer Reference Guide.
Faulty thermistor R2T / hydro PCB A1P.	Check thermistor R2T (see page 57).	Replace thermistor R2T (see page 141) or hydro PCB A1P (see page 91).
Faulty backup heater contactors (sticking) K1M, K2M or hydro PCB A1P.	Check backup heater control contactors K1M, K2M (see page 53).	Replace the contactor(s) or hydro PCB A1P (see page 91).

2.45. "80" – R4T entering water thermistor abnormality

Trigger	Effect	Reset
Thermistor detects an abnormal value (open or short circuit).	Unit will stop operating.	Auto-reset when problem is solved.

Possible cause	Check	Corrective action
Faulty entering water thermistor R4T (A1P) / hydro PCB A1P.	Check thermistor R4T (see page 57).	Replace thermistor R4T (see page 141) or hydro PCB A1P (see page 91).

2.46. "81" – Leaving water thermistor R1T abnormality

Trigger	Effect	Reset
Thermistor detects an abnormal value (open or short circuit).	Unit will stop operating.	Auto-reset when problem is solved.

Possible cause	Check	Corrective action
Faulty leaving water thermistor R1T / hydro PCB A1P.	Check thermistor R1T (see page 57).	Replace thermistor R1T (see page 141) or hydro PCB (see page 91).

3. Symptom based troubleshooting

By deeply analysing the system's components and logic, Daikin offers enhanced symptom based troubleshooting. To provide the best troubleshooting efficiency, the related root cause categories for each symptom are ranked. The following ranking is used: software control functions, end user related, parameter settings, installation related, component (mechanical or electrical) issues and system design related. This ranking was obtained by a combination of checking speed and the probability of occurrence.

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3.1. Capacity shortage - General

Valid for both space heating and domestic hot water capacity shortage.

INFORMATION

In case of unit capacity shortage a special capacity boost setting [A-03] can be activated to increase the maximum compressor frequency from 148 Hz to 193 Hz (unit capacity increase from 10 to 12 kW).

Possible failures	Root cause	Check	Corrective action
Root cause category: software control			
Compressor (M1C) frequency limited - high discharge temperature protection function active.	In case the discharge temperature is higher than 105°C the compressor frequency will be reduced. When the discharge temperature is lower than 105°C the frequency can increase again.	Activation of the protection function can be caused by various reasons, therefore we recommend to check the following: • Check refrigerant charge • Check expansion valve for correct operation (see page 71) and check suction sensor R3T (see page 57). • Check discharge thermistor (R2T) (see page 57).	Based on the diagnosis execute one of the following actions: • Correct the refrigerant charge (total charge: 1.8 kg). • Replace expansion valve (see page 131, page 133) or suction sensor R3T (see page 141). • Replace discharge thermistor R2T (see page 141).
Compressor (M1C) frequency limited - high pressure protection function active.	In case high pressure is higher than 38 barg the compressor frequency will be reduced. When the pressure drops below 36 barg the compressor frequency can increase again.	Activation of the protection function can be caused by various reasons, therefore we recommend to check the following: • Check high pressure sensor (see page 69). • Check high pressure side plate type heat exchanger (see page 66) for good water flow and heat exchange. • Check the refrigerant charge.	Based on the diagnosis execute one of the following actions: • Replace high pressure sensor (see page 135). • Optimize the waterflow through the high pressure side plate type heat exchanger. • Correct the refrigerant charge (total charge: 1.8 kg).

Possible failures	Root cause	Check	Corrective action
Compressor (M1C) frequency limited - suction pipe superheat protection function active.	This protection control activates when suction superheat is > 10°C and expansion valve is fully open (480 pulse). Unit returns to normal operation when suction superheat is < 4°C. Remark: check the suction superheat by measuring the suction temperature (with contact thermometer) before the compressor and comparing with the saturated evaporation temperature.	Activation of the protection function can be caused by various reasons, therefore we recommend to check the following: • Check refrigerant charge. • Check expansion valve for correct operation (see page 71) and check suction sensor (R3T) (see page 57). • Check the refrigerant circuit for blockages.	Based on the diagnosis execute one of the following actions: • Correct the refrigerant charge (total charge: 1.8 kg). • Replace expansion valve (see page 131, page 133) or suction sensor (R3T). • Remove detected blockages from the refrigerant circuit.
Root cause category: end user			
Space heating or domestic hot water operation is not activated on the user interface.		Confirm if space heating operation or domestic hot water operation is activated on user interface.	Activate space heating or domestic hot water operation on the user interface.
Root cause category: parameter (setting)			
Displayed date/time is wrong - schedules not correctly executed.	• Not set date/time after initial startup. • No power supply for more than 48 hours.	Check date/setting and content of schedules.	Set date/time according to operation manual instructions.
Displayed date/time is wrong - schedules not correctly executed.	Daylight Saving Time not set correctly.	Check Daylight Saving Time settings.	Set Daylight Saving Time according to operation manual.
Schedules not activated.	Schedules were not confirmed (refer to schedule settings).	Check schedules on the user interface.	Set schedule according to user reference guide.
Holiday setting active.	Holiday setting is activated in the user interface.	Check holiday settings.	Set holiday settings correctly.
Backup heater operation disabled.	Setting backup heater operation mode [4-00] is set to 0 (disable).	Check setting [4-00].	Change setting [4-00] to 1.
Second step (6 kW) of the backup heater is not allowed.	Setting "enable backup heater step 2" [4-07] is set to 0 (not allowed).	Check setting [4-07].	Change setting [4-07] to 1.
Backup heater equilibrium point was set too low.	Setting "equilibrium temperature" [5-01] was set too low.	Check setting [5-01].	Change setting [5-01] to 0 or higher to more quickly allow backup heater operation.
Root cause category: installation			
Brine circuit leakage.	Brine loop not pressure tested.	Pressure test brine loop.	Repair leakage if required.
Brine circuit (partially) blocked.	Obstruction in brine system.	Check brine circuit for blockages	Remove possible blockages and check the brine quality.
Brine circuit (partially) frozen.	Glycol concentration not OK.	• Check brine concentration. • Check brine freeze up temperature Tf (setting A-04). • Pressure test brine loop to check for leaks.	
Air in the brine system.	Not enough air purged.	• Check if all air purge valves are open. • Check if air purge valves are installed on all highest points of the field installed brine system.	Purge air out of unit and field supplied brine system.

Possible failures	Root cause	Check	Corrective action
Brine filter (FI1) (partially) blocked.	Dirty brine.	Check brine filter.	• Clean the brine filter (see page 96). • Check the brine quality.
Evaporator (partially) blocked (brine side).	Dirty brine.	Check the brine plate type heat exchanger (see page 66) for blockage.	Replace the brine plate type heat exchanger if blocked.
Evaporator (partially) frozen (brine side).	Brine concentration not OK.	• Check brine concentration • Check brine freeze up temperature Tf (setting A-04).	
PHE condensor (water side) (partial) blockage.	Dirty water (particles).	• Check waterflow rate registered by flowsensor. • Check water side plate type heat exchanger (see page 66) for blockage.	• If required replace the water plate type heat exchanger. • Check the water quality.
3-way valve bypass between domestic hot water and space heating.	3-way valve incorrectly mounted.	Check the 3-way valve (see page 78).	Correct the position of the 3-way valve (see page 123) and (see page 126).
Water filter (FI2) blocked.	Dirty water.	• Check water filter. • Check water quality.	• Clean the water filter (see page 98). • Check the water quality.
Air in the water circuit.	Not enough air purged.	• Check if all air purge valves are open • Check if air purge valves are installed on all highest points of the field installed water circuit	Purge air out of unit and field supplied water system and backup heater.
Water circuit (partially) blocked.	Dirty water.	Check water circuit (unit + field) for blockages.	Remove possible blockages and check the water quality.
Root cause category: component - mechanical			
Refrigerant shortage.	• Refrigerant leakage. • Incorrectly charged.	• Check refrigerant charge • Pressure test the system to check for leakage.	If required, repair the leak and charge the correct refrigerant amount (1.8 kg).
Air Purge (AP) blocked - air trapped in water system.	Component failure.	Check air purge valve.	Replace air purge valve.
Root cause category: component - electrical			
High pressure sensor (B1PH) - higher pressure measured than actual.	Deviation of pressure sensor (higher value measured than actual).	Check high pressure sensor (see page 69).	Replace high pressure sensor (see page 135)
Discharge thermistor (R2T - A9P) - higher temperature measured than actual.	Deviation of thermistor (higher temperature measured than actual).	Check discharge thermistor (see page 57).	Replace discharge thermistor R2T (see page 141) or replace PCB A9P (see page 94).
Expansion valve (K1E) incorrect control - superheat too high.	• Faulty suction (R3T) thermistor. • Faulty expansion valve control.	• Check thermistor R3T (see page 57). • Check the expansion valve (see page 71).	Replace thermistor R3T (see page 141) or replace expansion valve (see page 131, page 133).
Backup heater 3/6 kW not working.	Component failure.	Check backup heater (see page 53).	Replace backup heater (see page 104).
Deviation of backup heater outlet thermistor (R2T in - A1P) will influence the backup heater control.	• Deviation of thermistor (higher temperature measured than actual). • Bad contact between sensor and pipe.	Check thermistor R2T (see page 57).	Replace thermistor R2T (see page 141) or PCB A1P.
Flow sensor deviation - flow measured higher than actual.	Component failure.	Check the flow sensor.	Replace the flow sensor.
3-way valve blocked.	Component failure.	Check the 3-way valve (see page 78).	Replace the 3-way valve (see page 123) and (see page 126).

Possible failures	Root cause	Check	Corrective action
Root cause category: system design			
Brine circuit too small.	Incorrect design - brine circuit too small.	Check temperature difference between brine leaving (R6T) and brine entering (R5T). Brine circuit could be too small in case temperature difference is too low or continuously decreasing.	Modify the brine system.

3.2. Capacity shortage - Space heating

INFORMATION

Refer to "Capacity shortage - General" on page 36 for an overview of the general causes (both for space heating and domestic hot water) which can lead to capacity shortage.

Possible failures	Root cause	Check	Corrective action
Root cause category: end user			
Too low leaving water temperature setpoint.	User set too low leaving water temperature setpoint by schedule or manual operation.	Check leaving water setpoint.	Adapt leaving water setpoint. (Remark: check the weather dependent settings (relation outdoor temperature - setpoint) in case weather dependent control is activated.)
Too low space heating setpoint on room thermostat.	User set too low room setpoint by schedule or manual operation.	Check room thermostat setpoint.	Adapt room thermostat setpoint. (Remark: check the weather dependent settings (relation outdoor temperature - setpoint) in case weather dependent control is activated.)
Space heating not activated.		Check if space heating is activated.	
Root cause category: parameter (setting)			
External room thermostat used with setting [A.2.1.7] on value 2 (= user interface thermostat control).	Wrong setting of [A.2.1.7] - unit control method.	Check setting [A.2.1.7].	Adjust setting to match application - refer to installers reference guide.
Backup heater operation disabled (setting [4-00] is set to 0).	Setting backup heater operation mode [4-00] is set to 2 (only domestic hot water).	Check setting [4-00].	Change setting [4-00] to 1.
Setting domestic hot water operation mode [6-0D] not set optimally.	Setting domestic hot water operation mode [6-0D] is set to 0 (reheat only). This will cause the system to work too frequently in domestic hot water operation and less in space heating.	Check setting [6-0D].	It is advisable to set to factory setting (reheat + schedule) and program the schedule to heat the domestic hot water during periods of no space heating required.
Root cause category: installation			
3-way valve does not switch correctly between space heating connection and domestic hot water connection.	3-way valve incorrectly mounted.	Check the 3-way valve(see page 78).	Correct the position of the 3-way valve (see page 123) and (see page 126).

Possible failures	Root cause	Check	Corrective action
Root cause category: component - electrical			
3-way valve blocked.	Component failure.	Check the 3-way valve(see page 78).	Replace the 3-way valve (see page 123) and (see page 126).
Root cause category: system design			
Water circuit - requested capacity too high.	Incorrect system selection.	Check required capacity by heat load calculation. Refer to the capacity tables in the engineering databook to know max. system capacity at indicated conditions.	Adapt system design.
Water circuit - water volume too big.	• Long water piping. • Too many heating emitters.	Check required capacity by heat load calculation. Refer to the capacity tables in the engineering databook to know max. system capacity at indicated conditions.	Adapt system design.
Water circuit - pressure drop too big.	• Too small water piping. • Too long water piping. • Too many heating emitters.	Compare the pressure drop of the total system with the water pump characteristics (refer to check of water pump). Decreased water flow will cause a drop in capacity.	Adapt system design.

3.3. Capacity shortage - Domestic hot water operation

INFORMATION

Refer to "Capacity shortage - General" on page 36 for an overview of the general causes (both for space heating and domestic hot water) which can lead to capacity shortage.

Possible failures	Root cause	Check	Corrective action
Root cause category: end user			
Too low domestic hot water setpoint.	User set too low domestic hot water setpoint by schedule or manual operation.	Check domestic hot water tank set temperature in combination with boiler volume and hot water usage.	Adapt domestic hot water setpoint (e.g. 50-55°C). (Remark: check the weather dependent settings (relation outdoor temperature - setpoint) in case weather dependent control is activated.)
Domestic hot water not activated.		Check if domestic hot water heating is activated.	
Root cause category: parameter (setting)			
Setting domestic hot water operation mode [6-0D] not set optimally.	Setting domestic hot water operation mode [6-0D] is set to 2 (scheduled only).	Check setting [6-0D].	In case schedule only is used assure that the programmed schedule is inline with the timings hot water is required. Adapt the schedules when necessary.
Root cause category: installation			
3-way valve does not switch correctly between space heating connection and domestic hot water connection.	3-way valve incorrectly mounted.	Check the 3-way valve (see page 78).	Correct the position of the 3-way valve (see page 123) and (see page 126).

Possible failures	Root cause	Check	Corrective action
Root cause category: component - electrical			
3-way valve blocked.	Component failure.	Check the 3-way valve (see page 78).	Replace the 3-way valve (see page 123) and (see page 126).
Deviation of tank thermistor (R5T).	Tank thermistor measures a higher temperature than actual (component failure).	Check tank thermistor (R5T) (see page 57).	Replace thermistor R5T (see"Replacing a thermistor (except R10T)" on page 141).

3.4. The system does not start/operate

Possible failures	Root cause	Check	Corrective action
Root cause category: software control			
Thermostat ON conditions for space heating are not met.	Thermostat ON conditions for space heating are not met.	Confirm thermostat on conditions depending on the unit control method (setting C-07): • Setting -1: External room thermostat indicates by contact when to start/stop. • Setting -2: Room thermostat control => compare setpoint with room thermistor value. Thermo on: room temperature = setpoint - (hysteresis/2). Thermo off = room temperature + (hysteresis/2). For setting of hysteresis refer to setting 9-0C. • Setting -3: Leaving water temperature control => Thermo on: leaving water temperature = setpoint. Thermo off: leaving water temperature -1,5°C.	Change setpoint if required.
Thermostat ON conditions for domestic hot water operation are not met.	Thermostat ON conditions for domestic hot water operation are not met.	Confirm thermostat on conditions depending on the selected domestic hot water (DHW) control type (setting [6-0D]): 1. Reheat only: In case reheat setpoint is 55°C or lower: domestic hot water will go thermo off when reheat setpoint (setting [6-0C]) is reached. Domestic hot water will go thermo on when reheat setpoint (setting [6-0C]) -10°C is reached. In case reheat setpoint is higher than 55°C: domestic hot water will go thermo off when reheat setpoint (setting [6-0C])+ (setting [7-00]) is reached. Domestic hot water will go thermo on when reheat setpoint (setting [6-0C]) - (setting [7-01]) is reached. 2. Schedule only: domestic hot water will go thermo off when setpoint (setting [6-0A] or [6-0B]) is reached. Domestic hot water will only go thermo on at time of schedule demand. 3. Schedule + reheat combination of 1) and 2).	Change setpoint if required.
Out of operation range (brine temperature not OK).	Brine entering temperature lower than freezing temperature (Tf) + 6,5 K will stop the unit.	No action - unit cannot operate when brine temperature becomes too low (risk of freezing).	

Possible failures	Root cause	Check	Corrective action
Out of operation range (ambient temperature above 35°C).	Ambient temperature higher than 35°C.	No action - unit cannot operate when ambient temperature is above 35°C.	
Activation of the brine freeze up protection control.	Several conditions possible to have brine freeze up protection control active (in function of Tf (setting [A-04])): 1. Brine out temp (R6T out) < Tf + 3,5 K 2. Brine in temp (R5T out) < Tf + 6,5 K 3. Te* < Tf - 3,5 K 4. Te* < Tf - 2,5 K for 30 seconds 5. Te* < Tf - 1,5 K for 2 minutes Te*: lowest value measured comparing following sensor (R4Tout, R3Tout, R6Tout).	Check brine in temperature (possible via installer level of the user interface) and compare with the freeze up temperature Tf (setting [A-04]).	If required change brine mixture and program freeze up temperature accordingly.
Root cause category: end user			
Space heating or domestic hot water operation is not activated on the user interface.		Confirm if space heating operation or domestic hot water operation is activated on user interface.	Activate space heating or domestic hot water operation on the user interface.
Root cause category: parameter (setting)			
Displayed date/time is wrong - schedules not correctly executed.	• Not set date/time after initial startup. • No power supply for more than 48 hours.	Set date/time according to operation manual instructions.	Set date/time according to operation manual instructions.
Displayed date/time is wrong - schedules not correctly executed.	Daylight Saving Time not set correctly.	Check Daylight Saving Time settings.	Set Daylight Saving Time according to operation manual.
Incorrect setting of unit control method (setting [C-07]).	Incorrect setting of unit control method (setting [C-07]) (leaving water control, room thermostat control, ext. room thermostat control).	Check if setting [C-07] (leaving water control, room thermostat control, ext. room thermostat control) is in set according to the application.	
Incorrect setting of user interface location (user menu [A.2.1.B]).	Incorrect setting of user interface location (user menu [A.2.1.B]) (at unit/in room).	Check if setting of user interface location (user menu [A.2.1.B]) (at unit/in room) is set correctly.	
Incorrect setting of space heating OFF temperature (setting [4-02]).	Incorrect setting of space heating OFF temperature (setting [4-02]).	Check if setting space heating OFF temperature (setting [4-02]) is correct (keep at 35°C).	
Preferential kWh rate power supply settings and electrical connections do not match.	Preferential kWh rate power supply settings and electrical connections do not match.	Check preferential kWh rate power supply settings and electrical connections.	
Root cause category: component - electrical			
Deviation of brine entering (R5T - A9P) thermistor can cause incorrect activation of brine freeze up temperature.	• Component problem. • Bad contact between sensor and piping.	Check thermistor R5T - A9P (see page 57).	Replace thermistor R5T (see page 141) or PCB A9P (see page 94).

Possible failures	Root cause	Check	Corrective action
Deviation of brine leaving (R6T - A9P) thermistor can cause incorrect activation of brine freeze up temperature.	• Component problem. • Bad contact between sensor and piping.	Check thermistor R6T - A9P (see page 57).	If required replace thermistor R6T (see page 141) or PCB A9P (see page 94).
Hydro PCB A1P not operational.	• No power supply. • Faulty transformer TR1. • PCB malfunction.	• Confirm if a small green led is blinking in regular intervals. • Confirm power supply towards PCB A1P. • Check good operation of transformer TR1.	• Re-establish power to PCB. Replace PCB A1P (see page 91) in case power supply and transformer TR1 are OK but led is not blinking.
Refrigerant/brine PCB A9P not operational.	• No power supply. • PCB malfunction.	• Confirm if the HAP led is blinking in regular intervals. • Confirm power supply towards PCB A9P.	Re-establish power to PCBA9P or replace PCB A9P (see page 94) in case power supply is OK but led is not blinking.
Inverter PCB [A10P] not operational.	• No power towards INV PCB. • PCB malfunction.	• Confirm if the HAP led is blinking in regular intervals. • Check if power is supplied towards PCB (follow wiring back to main power input and check all safeties and cables).	Re-establish power to PCB A10P or replace PCB A10P (see page 95) in case power supply is OK but led is not blinking.
Inverter PCB [A10P] does not give correct output to compressor.	Inverter circuit problem.	Check inverter PCB.	Replace inverter PCB A10P in case faulty (see page 95).
Reactor coil (L1R/L2R/L3R) broken.	Component problem.	Check continuity of the reactor coil.	Replace the reactor coil in case faulty.

3.5. Inaccurate temperature control (for both domestic hot water and space heating operation)

Possible failures	Root cause	Check	Corrective action
Root cause category: parameter (setting)			
Incorrect setting of unit control method (setting [C-07]).	Incorrect setting of unit control method (setting [C-07]) (leaving water control, room thermostat control, ext. room thermostat control).	Check if setting [C-07] (leaving water control, room thermostat control, ext. room thermostat control) is in set according to the application.	
Incorrect setting of user interface location (user menu [A.2.1.B]).	Incorrect setting of user interface location (user menu [A.2.1.B]) (at unit/in room).	Check if setting of user interface location (user menu [A.2.1.B]) (at unit/in room) is set correctly.	
Incorrect setting of pump operation mode (continuous, sample, request) (setting [F-0D]).	Incorrect setting.	Confirm setting [F-0].	Adapt setting [F-0] if required. (Factory setting: [F-0]=1).
Root cause category: installation			
User interface (A2P) - thermostat sensor value not representing room temperature.	Bad location of thermostat sensor (external influence) in case of room thermostat control (setting [C-07 - 2]).	Check if user interface is mounted in the correct position to measure the correct room temperature.	Correct the position of the user interface for more accurate room temperature measurement.

Possible failures	Root cause	Check	Corrective action
Root cause category: component - electrical			
Leaving water thermistor (R1Tin - A1P) deviation causes incorrect temperature control.	• Deviation of thermistor (lower temperature measured than actual). • Bad contact between sensor and pipe.	Check thermistor R1Tin (see page 57).	Replace R1T or PCB A1P (see page 91).
Deviation of domestic hot water tank thermistor (R5Tin - A1P). (Remark: only valid for inaccurate domestic hot water temperature control.)	• Deviation of thermistor. • Bad contact between sensor and pipe.	Check thermistor R5Tin (see page 57).	Replace thermistor R5T (see page 141) or PCB A1P (see page 91).
User interface (A2P) - thermostat sensor has incorrect reading of room temperature.	Deviation of user interface room temperature sensor.	Compare temperature measured by user interface with actual room temperature.	In case of deviation the room temperature offset can be adjusted through setting [2-0A].

3.6. Water leakage or water release via the water pressure relieve valve

Possible failures	Root cause	Check	Corrective action
Root cause category: installation			
Drain connection of water safety valve (SV2) leaking.	Bad connection between unit drain pipe and field drain pipe.	Check the drain connection of the water safety valve.	Correct the drain connection if required.
Drain of bottom drain plate not well connected.	Bad connection of bottom drain plate and field drain connection	Check the drain connection between the bottom drain plate and the field drain	Correct the drain connection if required.
Leakage of drain valve water side (DR3, DR4).	Valve not completely closed.	Check if drain valve is closed.	Close the drain valve.
Root cause category: component - mechanical			
Broken bellow of brine side expansion vessel (EXP1).	Component failure.	Check expansion vessel (see page 61).	Replace expansion vessel (see page 122).
Expansion vessel (EXP1) not pressurized.	Component failure.	Check expansion vessel (see page 61).	Replace expansion vessel (see page 122).
Safety valve water side (SV2) blocked.	Component failure.	Check safety valve (see page 60).	Replace safety valve (see page 108).
Safety valve water side (SV2) leaking.	Component failure.	Check safety valve (see page 60).	Replace safety valve (see page 108).
Leakage of drain valve water side (DR3, DR4).	Component failure.	Check drain valve.	Replace drain valve.
Domestic hot water tank leakage.	Component failure.	Check tank visually for leakages.	Repair leakages. If not possible, complete unit has to be replaced.
Air Purge (AP) leakage.	Component failure.	Check air purge valve for leakages.	Replace air purge valve.

3.7. Brine leakage

Possible failures	Root cause	Check	Corrective action
Root cause category: installation			
Drain connection of brine safety valve (SV1) leaking.	Bad connection between unit drain pipe (brine) and field drain pipe.	Check the drain connection of the brine safety valve.	Correct the drain connection if required.
Leakage of drain valve brine side (DR1, DR2).	Valve not completely closed.	Check if drain valve is closed.	Close the drain valve.
Root cause category: component - mechanical			
Safety valve brine side (SV1) blocked or leaking.	Component failure.	• Check safety valve (see page 60). • Check water (brine) quality.	Replace brine safety valve (see page 111).
Leakage of drain valve brine side (DR1, DR2).	Component failure.	Check drain valve.	Replace brine drain valve.
Broken bellow of brine side expansion vessel (EXP1).	Component failure.	Check expansion vessel (see page 60).	Replace brine expansion vessel (see page 122).
Expansion vessel (EXP1) not pressurized.	Component failure.	Check expansion vessel (see page 60).	Replace brine expansion vessel (see page 122).

3.8. Power consumption too high

Possible failures	Root cause	Check	Corrective action
Root cause category: end user			
Too high domestic hot water setpoint.	User set too high domestic hot water setpoint by schedule or manual operation.	Check domestic hot water tank set temperature; avoid electric heater use.	Adapt domestic hot water setpoint (e.g. 50-55°C).
Too high leaving water temperature setpoint.	User set too high leaving water temperature setpoint by schedule or manual operation.	Check leaving water setpoint.	Adapt leaving water setpoint (e.g. < 55°C will reduce backup heater operation).
Too high space heating setpoint on room thermostat.	User set too high room setpoint by schedule or manual operation.	Check room thermostat setpoint.	Adapt room thermostat setpoint.
Root cause category: parameter (setting)			
Too high leaving water temperature (LWT) - weather dependent.	Incorrect weather dependent setting --> too high LWT limit set [A.3.1.1.3] [A.3.1.2.3].	Check LWT high limit in weather dependent (setting [1-03]).	Adapt high LWT limit for weather dependent heating (setting [1-03]).
User interface thermostat used with setting [A.2.1.7] on value 1 (= external thermostat control).	Wrong setting of [A.2.1.7] - unit control method.	Check setting [A.2.1.7].	Adjust setting to match application - refer to installers reference guide.
Pump keeps running all the time during space heating operation.	Wrong setting of [A.2.1.9] - pump operation.	Check pump operation mode setting [F-0D].	Change setting [F-0D] from continuous operation (value 0) to Sample (1) or Request (2). Refer to installer reference guide for applicable value.
Setting disinfection operation day [2-00] was set to 0 (each day).	Setting disinfection operation day [2-00] was set to 0 (each day).	Check setting [2-00].	
Unit is running in emergency operation and is using backup heater only. [4-06] is set to 1.	Unit is running in emergency operation and is using backup heater only. [4-06] is set to 1.	Check setting [4-06].	

Possible failures	Root cause	Check	Corrective action
Backup heater equilibrium point was set too high.	Setting "equilibrium temperature" [5-01] was set too high.	Check setting [5-01].	Change setting [5-01] to less quickly allow backup heater operation.
Setting domestic hot water operation mode [6-0D] not set optimally.	Setting domestic hot water operation mode [6-0D] is set to 0 (reheat only). This will cause the system to work too frequently in domestic hot water operation and less in space heating.	Check setting [6-0D] in combination with the re-heat setpoint [6-0C].	It is advisable to set to factory setting (reheat + schedule) and program the schedule to heat the domestic hot water during periods of no space heating required.
Root cause category: component - electrical			
Deviation of backup heater outlet thermistor (R2Tin - A1P) will influence the backup heater control.	• Deviation of thermistor (lower temperature measured than actual). • Bad contact between sensor and pipe.	Check thermistor R2Tin (see page 57).	If required replace thermistor R2Tin (see page 141) or PCB A1P (see page 91).
Root cause category: system design			
Water circuit - requested capacity too high causing the system always to run at full capacity.	Incorrect system selection.	Check required capacity by heat load calculation. Refer to the capacity tables in the engineering databook to know max. system capacity at indicated conditions.	Adapt system design.

3.9. Increased sound level - brine pump

Possible failures	Root cause	Check	Corrective action
Root cause category: installation			
Brine pressure too low.	• Brine pressure not checked during filling. • Air was purged from the brine system after filling.	Check brine pressure.	Adjust brine pressure if required (1 - 2 barg).
Brine circuit (partially) blocked.	Obstruction in brine system.	Check brine circuit for blockages.	Remove possible blockages and check the brine quality.
Air in the brine system.	Not enough air purged.	• Check if all air purge valves are open. • Check if air purge valves are installed on all highest points of the field installed brine system.	Purge air out of unit and field supplied brine system.
Brine filter (FI1) (partially) blocked.	Dirty brine.	Check brine filter.	• Clean the brine filter (see page 96). • Check the brine quality.
Root cause category: component - mechanical			
Brine pump (M3P) mechanical problem.	Internal pump friction.	Check brine pump (see page 63).	If required replace brine pump (see page 103).

3.10. Increased sound level - water pump

Possible failures	Root cause	Check	Corrective action
Root cause category: installation			
Water filter (FI2) blocked.	Dirty water.	• Check water filter. • Check water quality.	Clean the water filter (see page 98).
Air in the water circuit.	Not enough air purged.	• Check if all air purge valves are open. • Check if air purge valves are installed on all highest points of the field installed water circuit.	Purge air out of unit and field supplied water system and backup heater.
Water pressure too low.	• Water pressure not checked during filling. • Air was purged from the water system after filling. • Leakage.	Check water pressure.	Adjust water pressure if required (1 - 2 barg).
Water circuit partially blocked.	Obstruction in the water system.	Check water circuit for blockages.	Remove possible blockages and check the water quality.
Root cause category: component - mechanical			
Water pump (M1P) mechanical problem.	Internal pump friction.	Check water pump (see page 65).	Replace water pump (see page 113).
Air Purge (AP) blocked - air trapped in water system.	Component failure.	Check air purge valve.	Replace air purge valve.

3.11. Increased sound level - compressor

Possible failures	Root cause	Check	Corrective action
Root cause category: parameter (setting)			
Capacity boost setting [A-03] activated.	Capacity boost setting [A-03] is set to 1. Compressor can run at 193 Hz instead of 148 Hz. Unit will deliver 12 kW instead of 10 kW. Due to the higher rotation frequency the compressor will make more noise.	Check setting [A-03].	
Root cause category: component - mechanical			
Compressor (M1C) increased bearing friction/bearing failure.	• Bad lubrification of compressor internal rotating parts. • Compressor at end of lifetime.	No checks possible.	Replace compressor.
Root cause category: component - electrical			
Expansion valve (K1E) incorrect control - superheat too low.	• Faulty suction R3T-A9P thermistor. • Faulty low pressure liquid (R4T-A9P) thermistor • Faulty expansion valve control.	• Check thermistors R3T and R4T (see page 57). • Check the expansion valve (see page 71).	If required replace thermistors R3T and R4T (see page 141) or replace expansion valve (see page 131, page 133).

3.12. Tapping water related

3.12.1. High water pressure at tapping point

Possible failures	Root cause	Check	Corrective action
Root cause category: component - mechanical			
Safety valve water side (SV2) blocked.	Component failure.	Check safety valve (see page 60).	If required, replace safety valve (see page 108).
Field installed pressure reducing valve problem.	• Pressure reducing valve (to reduce pressure of the main water supply) not installed. • Pressure reducing valve problem.	Check water system pressure before and after the water pressure reducing valve.	Install or replace water pressure reducing valve.

3.12.2. Tapping water has white colour

Possible failures	Root cause	Check	Corrective action
Root cause category: installation			
Extreme formation of anode residue.	Water quality and composition of the water (chlorides, conductivity) can lead to accelerated reduction of the anode in the tank and aluminiumhydroxides will be formed on the bottom of the tank. (Remark: a not well controlled water softener can cause an increased amount of chlorides in the water.)	Visual check for aluminiumhydroxide residue is only possible with endoscope.	• Drain and flush the tank to remove the aluminiumhydroxides. • Check correct setting of field supplied water softener (in case installed).

3.12.3. Bad odour from tapping water

Possible failures	Root cause	Check	Corrective action
Root cause category: installation			
Water circuit - bad odour of supply water.	Bad quality/contamination of supply water.	Check the water quality (odour/contamination) at cold domestic water inlet.	Assure that quality of entering water is OK.

3.13. Compressor related

3.13.1. Compressor does not start

Possible failures	Root cause	Check	Corrective action
Root cause category: software control			
Compressor (M1C) does not start because water loop temperature is too low.	Special software control activated - Water loop temperature is too low (< 24°C) causing only the backup heater to operate. Compressor will start when water temperature reaches 24°C or more.	Normal unit operation - no specific countermeasure required.	
Compressor (M1C) guard timer active.	Compressor guard timer active. Once compressor has stopped it takes 180 seconds before it can restart.	Normal unit operation - no specific countermeasure required.	
Root cause category: component - electrical			
Power cables (U, V, W) incorrectly connected to compressor (M1C).	Wrong assembly during repair.	Confirm that the U, V, W wiring is correctly connected. Refer to wiring diagram for an indication how to connect correctly.	Correct the UVW wiring (see page 117).

3.13.2. Compressor does not increase frequency

Possible failures	Root cause	Check	Corrective action
Root cause category: software control			
Compressor (M1C) frequency limited - high discharge temperature protection function active.	In case the discharge temperature is higher than 105°C the compressor frequency will be reduced. When the discharge temperature is lower than 105°C the frequency can increase again.	Activation of the protection function can be caused by various reasons, therefore we recommend to check the following: • Check refrigerant charge. • Check expansion valve for correct operation (see page 71) and check suction sensor (R3T) (see page 57). • Check discharge thermistor R2T (see page 57).	Based on the diagnosis execute one of the following actions: • Correct the refrigerant charge (total charge: 1.8 kg) • Replace expansion valve (see page 131, page 133) or suction thermistor R3T (see page 141). • Replace discharge thermistor R2T (see page 141).
Compressor (M1C) frequency limited - high pressure protection function active.	In case high pressure is higher than 38 barg the compressor frequency will be reduced. When the pressure drops below 36 barg the compressor frequency can increase again.	Activation of the protection function can be caused by various reasons, therefore we recommend to check the following: • Check high pressure sensor (see page 69) • Check high pressure side plate type heat exchanger for (see page 66) good water flow and heat exchange • Check the refrigerant charge	Based on the diagnosis execute one of the following actions: • Replace high pressure sensor (see page 135) • Optimize the waterflow through the high pressure side plate type heat exchanger • Correct the refrigerant charge (total charge: 1.8 kg)
Compressor (M1C) frequency limited.	Inverter control active - target water leaving temperature (target sat. high pressure) reached	Check if saturated high pressure temperature is within range to heat up the water to the required temperature	

Possible failures	Root cause	Check	Corrective action
Compressor (M1C) frequency limited - suction pipe superheat protection function active.	This protection control activates when suction superheat is > 10°C and expansion valve is fully open (480 pulse). Unit returns to normal operation when suction superheat is < 4°C. Remark: check the suction superheat by measuring the suction temperature (with contact thermometer) before the compressor and comparing with the saturated evaporation temperature.	Activation of the protection function can be caused by various reasons, therefore we recommend to check the following: • Check refrigerant charge • Check expansion valve for correct operation (see page 71) and check suction sensor (R3T) (see page 57). • Check the refrigerant circuit for blockages.	Based on the diagnosis execute one of the following actions: • Correct the refrigerant charge (total charge: 1.8 kg) • Replace expansion valve(see"Replacing the electronic expansion valve K1E body" on page 131, "Replacing the electronic expansion valve K1E electromagnet" on page 133) or suction sensor (R3T) • Remove detected blockages from the refrigerant circuit
Root cause category: installation			
PHE condensor (water side) (partial) blockage.	Dirty water (particles).	• Check waterflow rate registered by flowsensor. • Check water side plate type heat exchanger for blockage (see page 66).	• If required replace the water plate type heat exchanger. • Check the water quality.
Root cause category: component - mechanical			
Limited heat exchange between refrigerant loop and heat sink inverter could result in high inverter temperatures and limited compressor frequency.	• Bad contact between refrigerant loop and inverter heat sink. • Lack of refrigerant.	Check contact between refrigerant loop and inverter PCB heat sink.	
Root cause category: component - electrical			
Discharge thermistor (R2T - A9P) - higher temperature measured than actual.	Deviation of thermistor (higher temperature measured than actual).	Check discharge thermistor R2T (see page 57).	Replace discharge thermistor R2T (see page 141)or PCB A9P (see page 94).
Heat sink inverter thermistor (R10T - A10P) - deviation.	Deviation of thermistor (higher temperature measured than actual).	Check thermistor R10T (see page 57).	Replace R10T (see page 143) or PCB A10P (see page 95).
Expansion valve (K1E) incorrect control - superheat too high.	• Faulty suction R3T thermistor. • Faulty low pressure liquid (R4T - A9P) thermistor. • Faulty expansion valve control.	• Check thermistor R3T (see page 57). • Check the expansion valve (see page 71).	Replace thermistor R3T (see page 141) or replace expansion valve(see page 131, page 133).

3.14. Pump related

3.14.1. Brine pump behavior

Possible failures	Root cause	Check	Corrective action
Root cause category: software control			
Unexpected brine pump behavior.	Brine pump software control.	Brine pump start/stop conditions: • Brine pump starts: space heating or domestic hot water thermostat on condition reached. • Brine pump stops: 45 seconds after space heating or domestic hot water thermostat off condition reached.	

3.14.2. Water pump behavior

Possible failures	Root cause	Check	Corrective action
Root cause category: software control			
Unexpected water pump behavior	Water pump software control	Water pump start/stop conditions: • During space heating or domestic hot water off: the pump is off • During space heating or domestic hot water on: pump operation depends on setting [F-0D] (continuous, sample or request) Remark: in domestic hot water operation the pump starts later than the compressor to avoid that the tank is cooled down by the cold water loop.	
Root cause category: parameter (setting)			
Incorrect setting of pump operation mode (continuous, sample, request) (setting [F-0D])	Incorrect setting	Confirm setting [F-0]	Adapt setting [F-0] if required (factory setting: [F-0]=1)

3.15. User interface (no or strange display)

Possible failures	Root cause	Check	Corrective action
Root cause category: component - electrical			
Hydro PCB A1P not operational	• No power supply • Faulty transformer TR1 • PCB malfunction	• Confirm if a small green led is blinking in regular intervals • Confirm power supply towards PCB A1P • Check good operation of transformer TR1	• Re-establish power to PCB • Replace PCB A1P (see page 91) in case power supply and transformer TR1 are OK but led is not blinking
Reactor coil (L1R/L2R/L3R) broken	Component problem	Check continuity of the reactor coil	Replace the reactor coil in case faulty
P1P2 transmission cable broken/short-circuit		Check P1P2 cable (16 VDC on BRC terminals and cable continuity)	Repair P1/P2 cable if required
User interface (A2P) failure		Replace user interface	

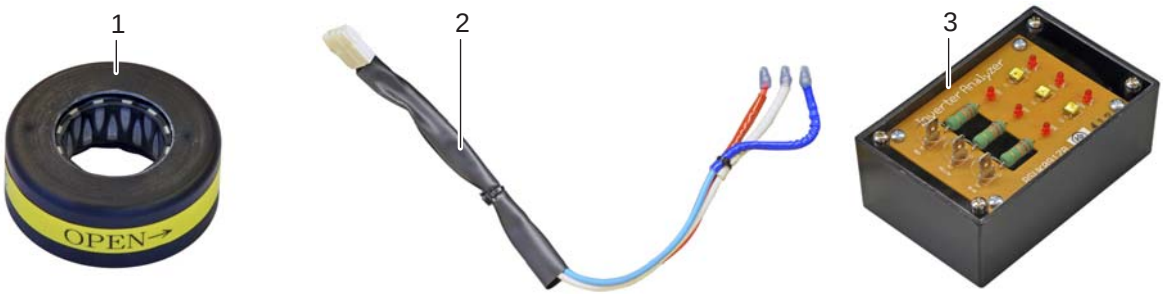
4. Component checklist

Overview of component checklists:

Required tools for component check 53
Backup heater E1H, E2H 53
Thermistors R1T, R2T, R3T, R4T, R5T, R6T, R10T 57
Safety valve SV1, SV2 (pressure relief valve) 60
Expansion vessel EXP1, EXP2 61
Brine flow switch S1L 62
Brine pump M3P 63
Water pump M1P 65
Plate type heat exchanger PHE1, PHE2 66
Compressor M1C 68
High pressure sensor B1PH 69
High pressure switch S1PH 70
Electronic expansion valve K1E 71
Thermal protector backup heater Q1L 72
Inverter PCB A10P 74
Water flow sensor B1L 76
3-way valve M3S 78

4.1. Required tools for component check

Figure 1 - Required tools for component check

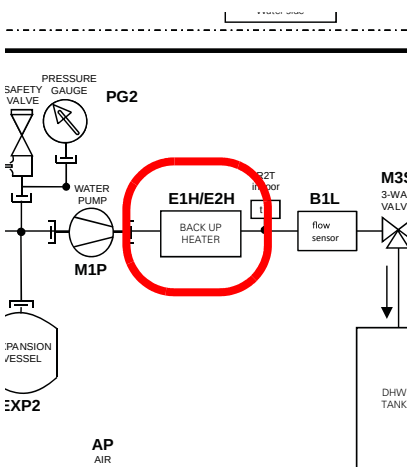
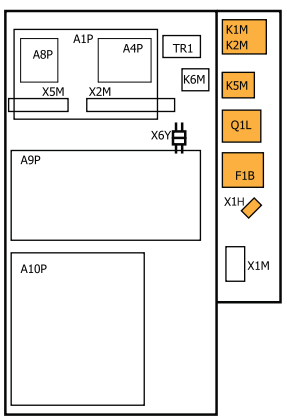
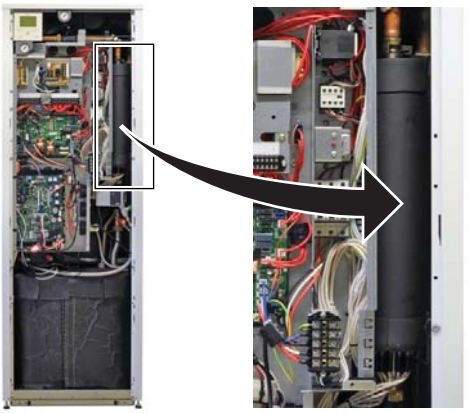


1. Magnet (tool part N° 9950038)
2. Extension cable (tool part N° 5011856)
3. Inverter analyzer (tool part N° 1368521)

4.2. Backup heater E1H, E2H

Technical specification	Description
The 2-stage backup heater is composed of heater E1H (3 x 1 kW) and E2H (3 x 2 kW).	The backup heater is used to assist the heat pump system to heat the water for space heating and domestic hot water operation.

Location

Piping diagram	Switch box	Unit
		

Check procedure

Mechanical check

Not applicable

Preliminary check

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
4. Check circuit breaker F1B; reset circuit breaker F1B if it has tripped.
5. Check thermal protector backup heater Q1L; reset thermal protector backup heater Q1L if it has tripped.

INFORMATION

If F1B or Q1L trip again, it is required to determine the root cause of the problem because something is overloading the electrical circuit or creating a short circuit.

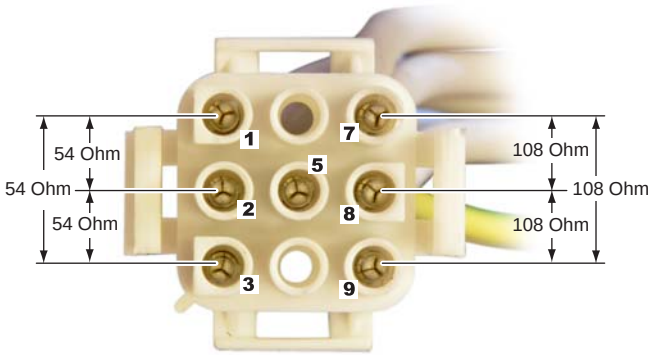
Electrical check

INFORMATION

If 1 or more checks fail, replace the backup heater.

Resistance / isolation check

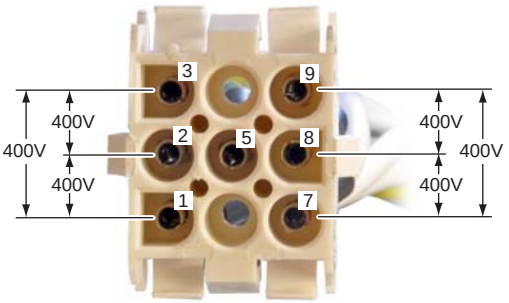
1. Unplug the connector X1H.
2. Measure the 3x1 kW heater resistance between X1H 1-2, X1H 1-3 and X1H 2-3.
3. All values must be 108 Ohm ±10%; if not, replace the backup heater, refer to "Replacing the backup heater" on page 104.
4. Measure the 3x2 kW heater resistance between X1H 7-8, X1H 8-9 and X1H 7-9.
5. All values must be 54 Ohm ±10%; if not, replace the backup heater, refer to "Replacing the backup heater" on page 104.



6. Perform a Megger test (500 V) on the X1H 5 (GND) and X1H 1.
7. The isolation resistance must exceed 3 MOhm.
8. Perform a megger test (500 V) on the X1H 5 (GND) and X1H 7.
9. The isolation resistance must exceed 3 MOhm; if not, replace the backup heater, refer to "Replacing the backup heater" on page 104.

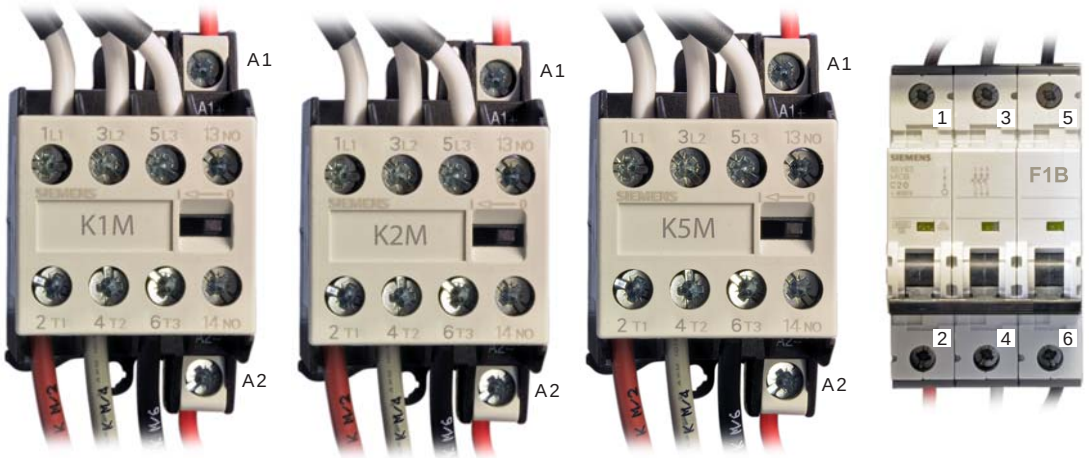
Overall power circuit check

1. Unplug the connector X1H.
2. Power the Daikin Altherma GSHP.
3. Activate “Installer level” on the user interface, refer to “Installer Level Settings” on the user interface are available in the Installer Reference Guide, paragraph To access the most used commands.
4. Select Actuator test run A.7.4.
   - Activate BUH step 1.
   - Activate BUH step 2.
5. Check the status of Back-Up Heater step 1/2 in Menu 6.5 (actuators); status must be:
   - 6.5.3 BUH step 1 ON
   - 6.5.4 BUH step 2 ON
6. Measure the voltage between connector X1H 1-2, X1H 1-3 and X1H 2-3:
   - All voltages must be 400 VAC ±10%.
7. Measure the voltage between connector X1H 7-8, X1H 8-9 and X1H 7-9:
   - All voltages must be 400 VAC ±10%.



Circuit breakers / thermal protector backup heater check

1. If not all voltages are present on connector X1H:
   - Measure the voltage on contactor K2M A1-A2.
     The voltage must be 230 VAC ±10%; if no voltage is present, check K2M A1-A2 wiring or replace A1P.
   - Measure the voltage on contactor K5M A1-A2.
     The voltage must be 230 VAC ±10%; if no voltage is present, check the electrical conductivity of Q1L: pin 11 - 12 and replace Q1L if pin11 - 12 not conducting.

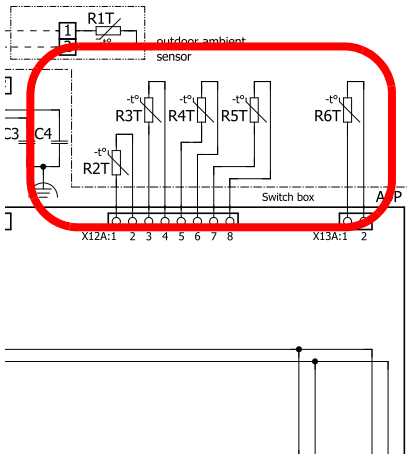
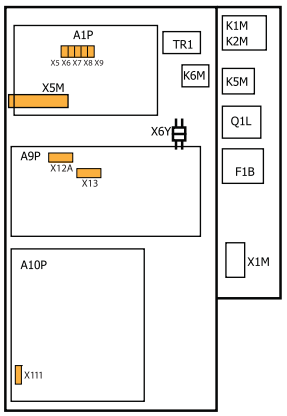
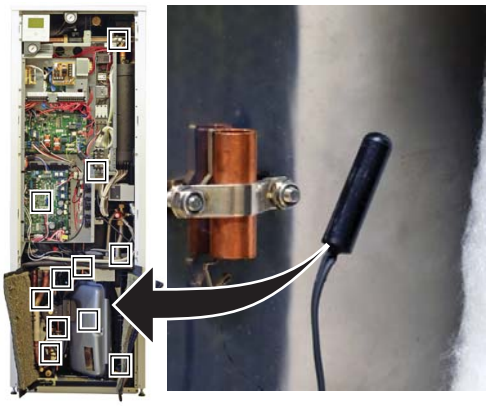


2. Confirm correct operation of K2M:
   - Between contactor K2M 1 - 3, K2M 3 - 5 and K2M 1 - 5; all voltages must be 400 VAC ±10%.
   - Between contactor K2M 2 - 4, K2M 4 - 6 and K2M 2 - 6; all voltages must be 400 VAC ±10%.
   - If voltage are OK on pins 2 - 4 - 6 but not on pins 1 - 3 - 5, replace K2M.
3. Confirm correct operation of K5M:
   - Between K5M 1 - 3, K5M 3 - 5 and K5M 1 - 5; all voltages must be 400 VAC ±10%.
   - Between K5M 2 - 4, K5M 4 - 6 and K5M 2 - 6; all voltages must be 400 VAC ±10%.
   - If voltage are OK on pins 2 - 4 - 6 but not on pins 1 - 3 - 5, replace K5M.
4. Measure the voltage between X1H 7-8, X1H 8-9 and X1H 7-9.
   - All voltages must be 400 VAC ±10%.
5. If no voltage is present, measure the voltage on K1M A1-A2.
   - The voltage must be 230 VAC ±10%; if no voltage is present, check K1M A1-A2 wiring or replace A1P.
6. Confirm correct operation of K1M:
   - Between K1M 1 - 3, K1M 3 - 5 and K1M 1 - 5; all voltages must be 400 VAC ±10%.
   - Between K1M 2 - 4, K1M 4 - 6 and K1M 2 - 6; all voltages must be 400 VAC ±10%.
   - If voltage are OK on pins 2 - 4 - 6 but not on pins 1 - 3 - 5, replace K1M.
7. Confirm correct operation of F1B:
   - Between F1B 1 - 3, F1B 3 - 5 and F1B 1 - 5; all voltages must be 400 VAC ±10%.
   - Between F1B 2 - 4, F1B 4 - 6 and F1B 2 - 6; all voltages must be 400 VAC ±10%.
   - If voltage are OK on pins 2 - 4 - 6 but not on pins 1 - 3 - 5, replace F1B.

4.3. Thermistors R1T, R2T, R3T, R4T, R5T, R6T, R10T

Technical specification	Description
3 different types of thermistors are used; the resistance vs. temperature characteristic for the each type is shown in Table 2-2 on page 59.	The thermistors are used to measure the temperature at multiple locations inside the Daikin Altherma GSHP. The measured temperatures are processed by the A1P board.

Location

Wiring diagram	Switch box	Unit
		

Check procedure

Mechanical check

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Locate the thermistor and check if thermal contact with the piping or ambient is ensured.

Electrical check

INFORMATION

If a thermistor check fails, replace the thermistor.

Thermistors R2T/R3T/R4T/R5T (AP9) must be replaced together.

If R10T must be replaced, refer to "Replacing temperature sensor R10T" on page 143.

The tables below must be used to compare the measured resistance with the correct resistance for the measured temperature with a contact thermometer.

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
4. From the table below, select the thermistor that must be checked.
5. Measure the temperature of the thermistor using a contact thermometer.
6. Unplug the connector from the appropriate PCB and measure the resistance between the pins listed in Table 2-1 on page 58.
   - Compare the measured resistance with the range determined by the lower and higher temperature in Table 2-2 on page 59.
7. If the measured resistance does not match the listed value, the thermistor must be replaced, refer to "Replacing a thermistor (except R10T)" on page 141.

INFORMATION

All thermistors have a tolerance of 5%.

E.g. thermistor R4T (A9P):

- Measured temperature with contact thermometer: 23.1°C.
- Unplug the sensor and measure the resistance between X12A: 5-6: 21.3 kOhm.
- As defined in Table 2-1 on page 58, this is a type 1 thermistor; the resistance values are defined by Table 2-2 on page 59:
  - Resistance at 20°C: 25.0060 kOhm.
  - Resistance at 25°C: 20.0000 kOhm.
- The measured value 21.3 kOhm is inside the range, thermistor R4T (A9P) passes the check.

INFORMATION

The user interface “6.1. Sensor Information” allows to monitor most thermistors.

If the measured resistance of the thermistor matches the temperature measured with the contact thermometer but the temperature for the corresponding thermistor is not correct on the user interface display, replace PCB A9P (see page 94) or PCB10P (see page 95).

Table 2-1: Thermistors

Thermistor	Processed on PCB	Connector: pin	Type	User interface
R1T (outlet water)	A1P	X5A: 1-2	1	6.1.5 Leaving water (PHE)
R1T (ambient air)	A9P	X5M: 11-12	1	6.1.2 Outdoor temp.
R2T(after BUH)	A1P	X6A: 1-2	1	6.1.4 Leaving water
R2T (discharge)	A9P	X12A: 1-2	2	(not available)
R3T (refrigerant liquid)	A1P	X7A: 1-2	1	6.1.7 Refrigerant temp.
R3T(suction)	A9P	X12A: 3-4	1	(not available)
R4T (inlet water)	A1P	X8A: 5-6	1	6.1.6 Inlet water temp.
R4T (2 phase Tx)	A9P	X12A: 5-6	1	(not available)
R5T (domestic hot water tank)	A1P	X9A: 1-2	1	6.1.3 Tank temp.
R5T (brine entering)	A9P	X12A: 7-8	1	6.1.C Brine inlet temp.
R6T (brine leaving)	A9P	X13A: 1-2	1	6.1.D Brine outlet temp.
R10T (inverter heat sink)	A10P	X111A: 1-2	3	(not available)

Table 2-2: Thermistor resistance / temperature characteristics

Sensor type 1	
T°C	kΩ
-30	361.7719
-25	265.4704
-20	196.9198
-15	147.5687
-10	111.6578
-5	85.2610
0	65.6705
5	50.9947
10	39.9149
15	31.4796
20	25.0060
25	20.0000
30	16.1008
35	13.0426
40	10.6281
45	8.7097
50	7.1764
55	5.9407
60	4.9439
65	4.1352
70	3.4757
75	2.9349
80	2.4894
85	2.1205
90	1.8138
95	1.5575
100	1.3425
105	1.1614

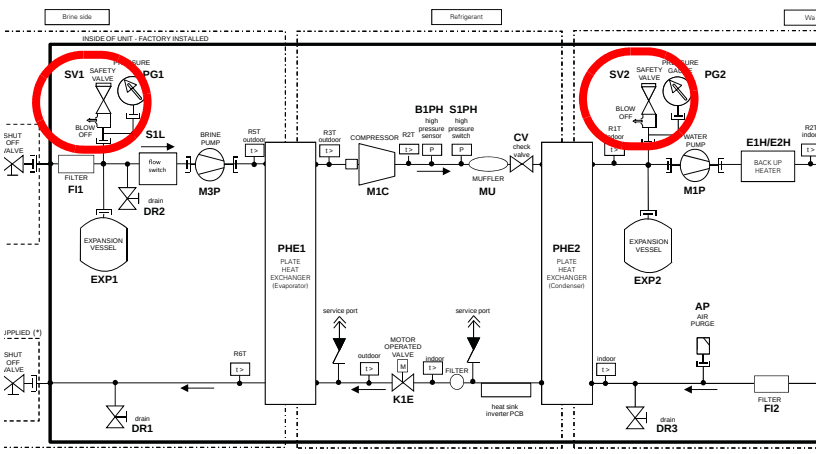
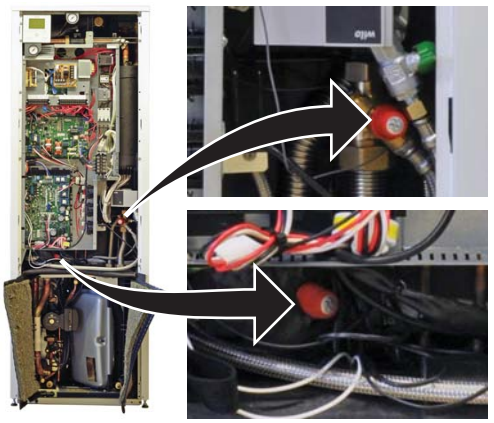
Sensor type 2	
T°C	kΩ
-30	3257.371
-25	2429.222
-20	1827.883
-15	1387.099
-10	1061.098
-5	817.9329
0	635.0831
5	496.5712
10	391.0070
15	309.9511
20	247.2696
25	198.4674
30	160.2244
35	130.0697
40	106.1517
45	87.0725
50	71.7703
55	59.4735
60	49.5180
65	41.4168
70	34.7923
75	29.3499
80	24.8586
85	21.1360
90	18.0377
95	15.4487
100	13.2768
105	11.4395
110	9.8902
115	8.5788
120	7.4650
125	6.5156
130	5.7038
135	5.0073
140	4.4080
145	3.8907
150	3.4429

Sensor type 3	
T°C	kΩ
-30	354.1
-25	259.7
-20	192.6
-15	144.2
-10	109.1
-5	83.25
0	64.10
5	49.70
10	38.85
15	30.61
20	24.29
25	19.41
30	15.61
35	12.64
40	10.30
45	8.439
50	6.954
55	5.761
60	4.797
65	4.014
70	3.375
75	2.851
80	2.418
85	2.060
90	1.762
95	1.513
100	1.304
105	1.128
110	0.9790
115	0.8527
120	0.7450
125	0.6530
130	0.5741

4.4. Safety valve SV1, SV2 (pressure relief valve)

Technical specification	Description
The pressure valve SV1 will open if the brine circuit pressure exceeds 3 bar. The pressure valve SV2 will open if the water circuit pressure exceeds 3 bar.	A pressure relief valve is a safety component that is designed to open at a predetermined set pressure to protect the brine and water circuit. The brine pressure relief valve SV1 is used to limit the pressure in the brine circuit. The water pressure relief valve SV2 is used to limit the pressure in the water circuit.

Location

Piping diagram	Unit
	

Check procedure

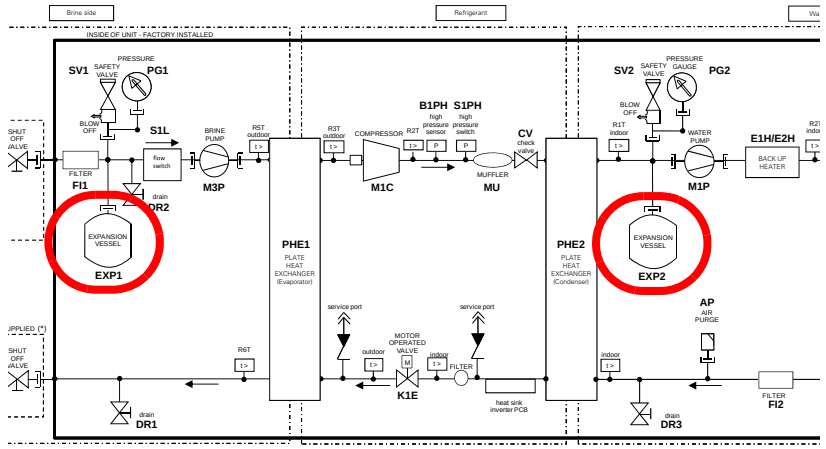
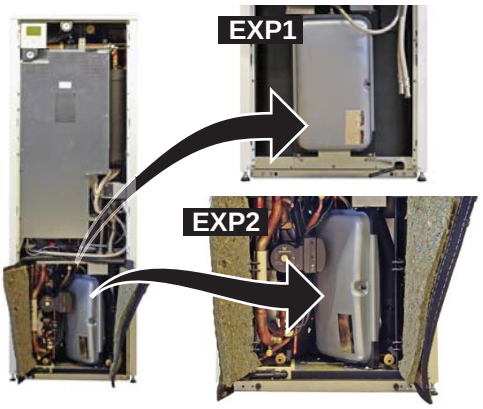
Mechanical check

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to the Daikin Altherma ground source heat pump Installer reference guide (EGSQH10S18AA9W).
3. Turn the brine pressure relief valve knob 1 turn and listen if brine exits for a short moment.
4. Check the brine pressure, it should be between 1 and 2 bar and stable when the pressure relief valve is closed.
5. Fill brine if required.
6. If no brine exits while turning the brine pressure relief valve knob the brine pressure relief valve must be replaced, refer to "Replacing the water pressure relief valve" on page 108.
7. Turn the water pressure relief valve knob and listen if water exits for a short moment.
8. Check the water pressure, it should be between 1 and 2 bar and stable when the pressure relief valve is closed.
9. Fill water if required.
10. If no water exits while turning the water pressure relief valve knob the water pressure relief valve must be replaced, refer to "Replacing the water pressure relief valve" on page 108.

4.5. Expansion vessel EXP1, EXP2

Technical specification	Description
The expansion vessel EXP1 has a capacity of 10 liter and is pre-pressurised at 1 bar. The expansion vessel EXP2 has a capacity of 10 liter and is pre-pressurised at 1 bar.	The expansion vessel is a small tank used to protect the closed water and brine circuits from excessive pressure. The tank is partially filled with air, whose compressibility absorbs excess water/brine pressure caused by thermal expansion.

Location

Piping diagram	Unit
	

Check procedure

Functional check

1. Power the Daikin Altherma GSHP.
2. Enable space heating or domestic hot water.
3. Check that the water temperature increases but that the water and brine circuit pressures remain stable.

INFORMATION

Fluctuating water/brine pressure can indicate a problem with the water/brine expansion vessel (the pre-pressure should be checked).

Mechanical check

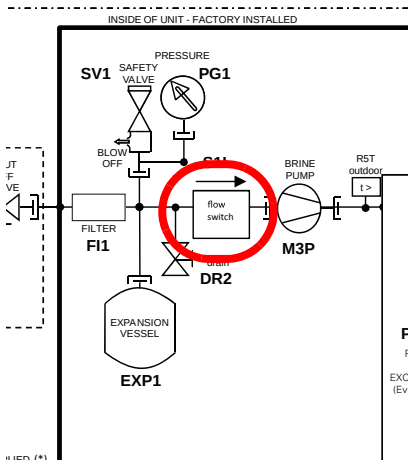
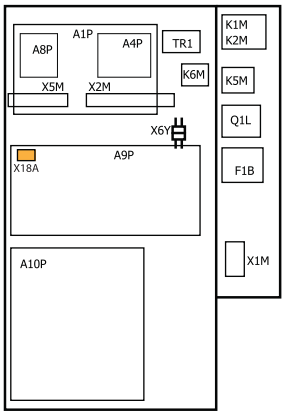
1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to the Daikin Altherma ground source heat pump Installer reference guide (EGSQH10S18AA9W).
3. Drain the water circuit, refer to "Draining the water circuit" on page 85.
4. Using a manometer, measure the pressure at the Schrader valve of the expansion vessel EXP2.
5. For the correct expansion vessel EXP2 pressure, refer to “Changing the pre-pressure of the expansion vessel in the Daikin Altherma ground source heat pump Installer reference guide (EGSQH10S18AA9W).
6. Drain the brine circuit, refer to "Draining the brine circuit" on page 84.
7. Using a manometer, measure the pressure at the Schrader valve of expansion vessel EXP1.
8. For the correct expansion vessel EXP1 pressure, refer to “Changing the pre-pressure of the expansion vessel in the Daikin Altherma ground source heat pump Installer reference guide (EGSQH10S18AA9W).

9. If it is not possible to pressurize the expansion vessel or when water/brine leaks from the Schrader valve, the internal bellow is leaking; refer to "Replacing the water expansion vessel" on page 121 or "Replacing the brine expansion vessel" on page 122.

4.6. Brine flow switch S1L

Technical specification	Description
The brine flow switch has a normally open contact. The brine flow switch contact closes when the brine flow equals or exceeds 25 l/m.	The brine flow switch is a mechanical switch that is switched on or off in response to the flow or non-flow of the brine in the brine circuit. The brine flow switch operates through the use of a paddle which gets displaced due to the force of brine moving past it.

Location

Piping diagram	Switch box	Unit
		

Check procedure

Mechanical check

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Drain the brine circuit, refer to "Draining the brine circuit" on page 84.
3. Loosen the brine flow switch nut.
4. Remove the brine flow switch and check that the paddle can move without applying force.

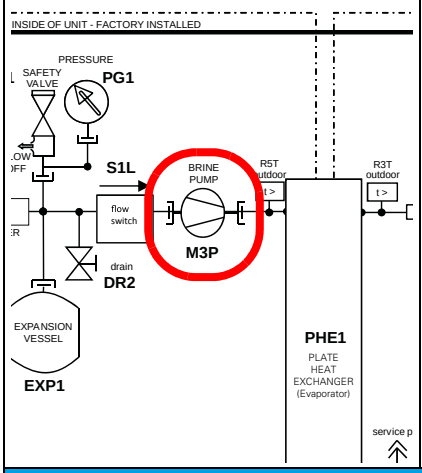
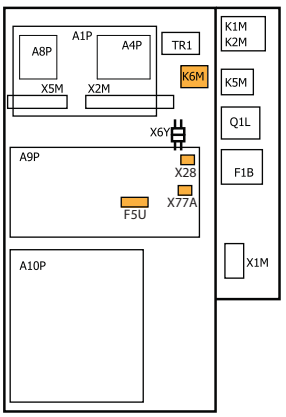
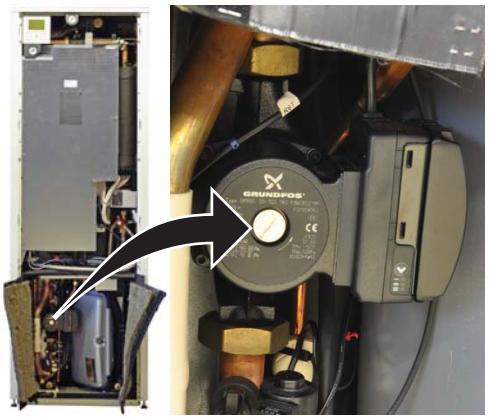
5. If the paddle is obstructed, the brine flow switch must be replaced.

Electrical check

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to the Daikin Altherma ground source heat pump Installer reference guide (EGSQH10S18AA9W).
3. Remove the switch box cover, refer to the Daikin Altherma ground source heat pump Installer reference guide (EGSQH10S18AA9W).
4. Unplug the connector X18A on the A9P PCB.
5. Measure the electrical conductivity between pin 2 and 4 of the connector on the flow switch; the value must be infinite.
6. Power the Daikin Altherma GSHP.
7. Activate “Installer level” on the user interface, refer to “Installer Level Settings” on the user interface are available in the Installer Reference Guide, paragraph To access the most used commands.
8. Select Actuator test run A.7.4.
9. Activate the brine pump (A.7.4.I).
10. Measure the electrical conductivity between pin 2 and 4 of the connector on the flow switch; the value must be 0 Ohm (zero).
11. If the conductance measurements are not correct, the brine flow switch must be replaced, refer to "Replacing the brine flow switch" on page 100.

4.7. Brine pump M3P

Technical specification	Description
The brine pump M3P is a 3 speed pump.	The brine pump M3P circulates the brine in the brine circuit.
Location	

Piping diagram	Switch box	Unit
		

Check procedure

Electrical check

INFORMATION

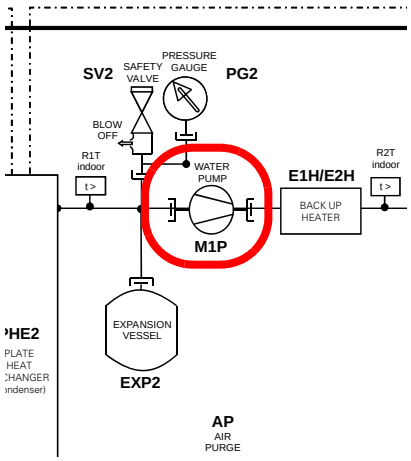
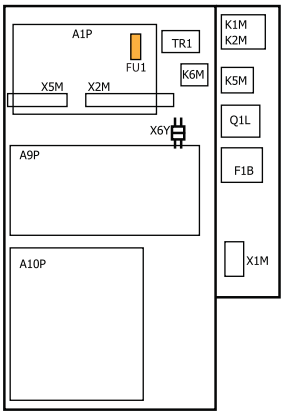
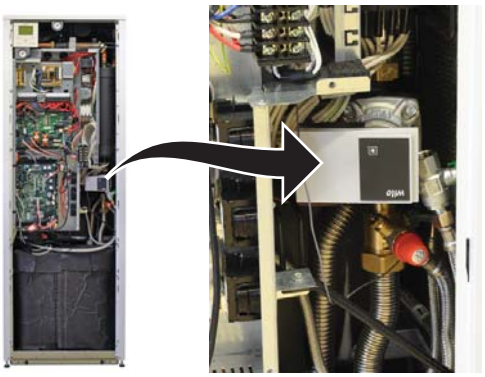
Highest speed brine pump speed (3 leds on) should always be enabled.

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Open the Sound Insulation (Front Side Only), refer to "Opening the sound insulation of the heat pump module (front side only)" on page 87.
4. Power the Daikin Altherma GSHP.
5. Activate “Installer level” on the user interface, refer to “Installer Level Settings” on the user interface are available in the Installer Reference Guide, paragraph To access the most used commands.
6. Select Actuator test run A.7.4. in the user interface menu.
7. Activate the brine pump (A.7.4.I).
8. Feel the pump body vibration to check pump functioning.
9. The 3 speed indicators on the pump must be lit, adjust the brine pump speed if required.
10. If no pump vibrations can be observed:
11. Check fuse F5U on A9P PCB, replace if blown.
12. Measure the voltage at X77A: pin 1 - 3 on A9P PCB, the voltage must be 230 VAC ±10%, if not replace A9P PCB.
13. Measure the voltage at X28A: pin 1 - 3, the voltage must be 230 VAC ±10%, if not, replace A9P PCB.
14. Check relay K6M. When energized, (230 VAC between pin 1-5), K6M pin 3-4 must be shorted.
15. If no vibration can be felt and all checks above are OK, replace the brine pump M3P; refer to "Replacing the brine pump" on page 103

4.8. Water pump M1P

Technical specification	Description
The water pump M1P is an inverter driven, variable speed pump (invertor signal from PCB A9P, connector X25A).	The water pump M3P circulates the water in the water circuit.

Location

Piping diagram	Switch box	Unit
		

Check procedure

Mechanical check

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Drain the water circuit.
3. Remove the 4 screws that fix the pump motor to the pump house.
4. Separate the pump motor from the pump house.
5. Inspect the rotor and check that it rotates smoothly.
6. After water pump assembly and filling the water circuit, check pump for leaks.
   - Replace the seal if the water pump leaks.

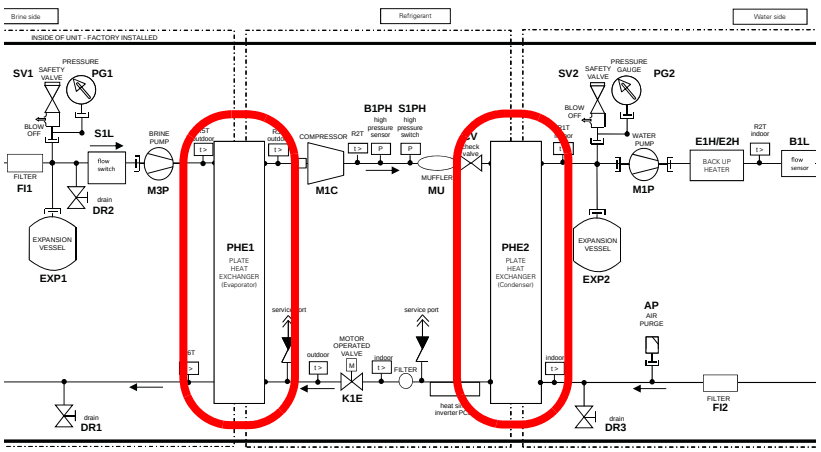
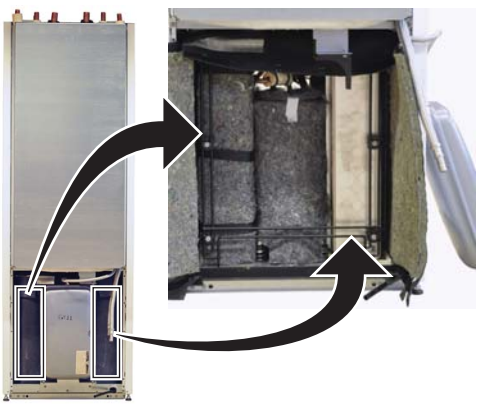
Electrical check

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Open the Sound Insulation (Front Side Only), refer to "Opening the sound insulation of the heat pump module (front side only)" on page 87.
4. Power the Daikin Altherma GSHP.
5. Activate “Installer level” on the user interface, refer to “Installer Level Settings” on the user interface are available in the Installer Reference Guide, paragraph To access the most used commands.
6. Select Actuator test run A.7.4.
7. Activate the water pump (A.7.4.6).
8. Check the LED on the water pump, it must light green.

LED Status	Meaning	Diagnostic	Cause	Corrective action
Lights green	Pump in operation	Pump runs according to its setting	-	-
Blinks green (fast)	PWM model	Pump in stand-by	Normal operation	-
Blinks red/green	Pump in operation but stopped	Pump will restart after fault is solved	Undervoltage U < 160 V or overvoltage U > 230 V	Check voltage supply 195 V < U < 253 V
			Module overheating: motor temperature too high	Check water and ambient temperature
Blinks red	Pump malfunction	Pump stopped (blocked)	Pump does not restart automatically due to permanent failure	Replace pump
Off	No power supply	No voltage present on electronics.	Pump is not connected to power supply	Check pump wiring
			LED is broken	Check if pump is running
			Pump electronics malfunctioning	Replace pump

9. If the LED does not light:
   - Check fuse FU1 on A1P, replace if blown.
   - Measure the voltage at X16A: pin 3 - 5 on A1P PCB, the voltage must be 230 VAC ±10%, if not, replace A1P.
10. Replace the water pump M1P, refer to "Replacing the water pump" on page 113.

4.9. Plate type heat exchanger PHE1, PHE2

Technical specification	Description
The plate type heat exchanger uses metal plates to transfer heat between two fluids. This improves the heat exchange as the fluids are exposed to a much larger surface compared to conventional heat exchangers. This facilitates the transfer of heat, increasing the speed of the temperature change.	The plate type heat exchanger PTH/1 transfers the heat from the brine circuit to the refrigerant circuit. The plate type heat exchanger PTH/2 transfers the heat from the refrigerant circuit to the water circuit.
Location	
Piping diagram	**Unit**
	
Check procedure	

Obstruction check (indication of possible blockage)

1. Remove the front panel, refer to "Removing the front panel" on page 83.
2. Open the Sound Insulation (Front Side Only), refer to "Opening the sound insulation of the heat pump module (front side only)" on page 87.
3. Power the Daikin Altherma GSHP and activate domestic hot water or space heating and wait 15 minutes.
4. Activate “Installer level” on the user interface, refer to “Installer Level Settings” on the user interface are available in the Installer Reference Guide, paragraph 8.1.2 To access the most used commands.
5. Check menu 6.1.D Brine outlet temp.
6. Check the saturated low pressure value and its corresponding temperature on the manifold and compare it with the temperature displayed for R6T (brine outlet temp) on the user interface 6.1.D.
7. A temperature difference of 5 to 10°C is acceptable; if the temperature difference exceeds 10°C, the plate type heat exchanger PTH/2 efficiency is too low and could indicate partial blockage.
8. Check Leaving water (PHE) temperature on the user interface (6.1.5).
9. Check the saturated high pressure value and its corresponding temperature on the manifold and compare it with the temperature displayed for R1T (Leaving water (PHE)) on the user interface (6.1.5).
10. A temperature difference of 5 to 10°C is acceptable; if the temperature difference exceeds 10°C, the type heat exchanger PTH/2 efficiency is too low and could indicate partial blockage.

Leak test

Check 1

1. Check the brine manometer; raised brine pressure indicates a refrigerant leak in PHE1.
2. Check the water manometer; raised water pressure indicates a refrigerant leak in PHE2.

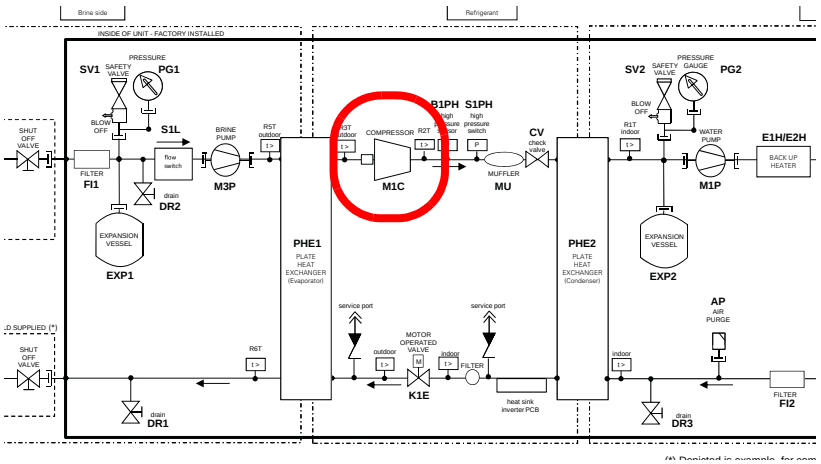
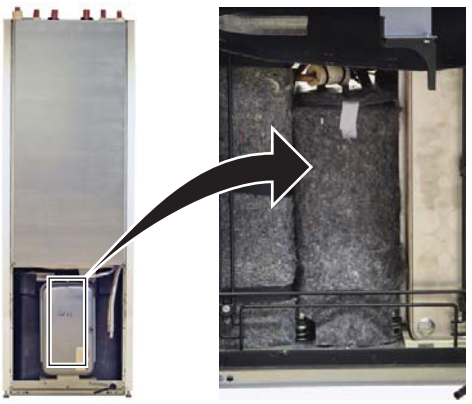
Check 2

1. Visually check the plate type heat exchangers PHE1-2 for water or brine leakage.
2. In case there is an indication of a possible leakage of PHE1-2, perform a leak test.

Check 3

1. Connect a manifold to the low and high pressure service ports.
2. Recover the refrigerant.
3. Perform a pressure test if less than 1.8 kg refrigerant is recovered.
4. Pressurize the refrigerant circuit with Nitrogen at 40 bar.
5. Check the pressure after 30 minutes.
6. Decrease of nitrogen pressure and increase of brine pressure indicates a leakage of PHE1.
7. Decrease of nitrogen pressure and increase of water pressure indicates a leak of PHE2.

4.10. Compressor M1C

Technical specification	Description
Compressor name: 2YC63PXD#C. Type: inverter driven, double swing.	The compressor M1C compresses the refrigerant in the refrigerant circuit.
Location	
Piping diagram	**Unit**
	
Check procedure	
Electrical check	

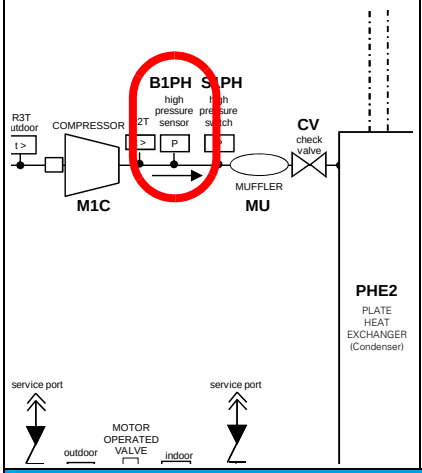
1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
3. Disconnect the connectors U, V and W from PCB A10P.
4. Measure the compressor motor windings U-V, V-W and U-W; all measurements must read 1.7 Ohm.
5. Megger the compressor using 500 or 1000 V DC, the insulation must be higher than 3 MOhm.
6. Replace the compressor if the windings and/or insulation measurements fail.
7. Run the compressor and measure the current in each phase; the current for each phase should be identical and between 4 and 7 A. When the current exceeds 10 A during normal operation, it could indicate internal wear of the compressor. In that case it can be decided to preventively replace the compressor, refer to "Replacing the compressor" on page 117.

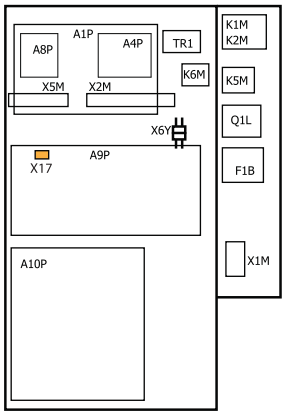
4.11. High pressure sensor B1PH

Technical specification	Description
The high pressure sensor B1PH is an analog pressure sensor.	The high pressure sensor B1PH measures the pressure in the high pressure section of the refrigerant circuit.

Location

Piping diagram	Switch box	Unit

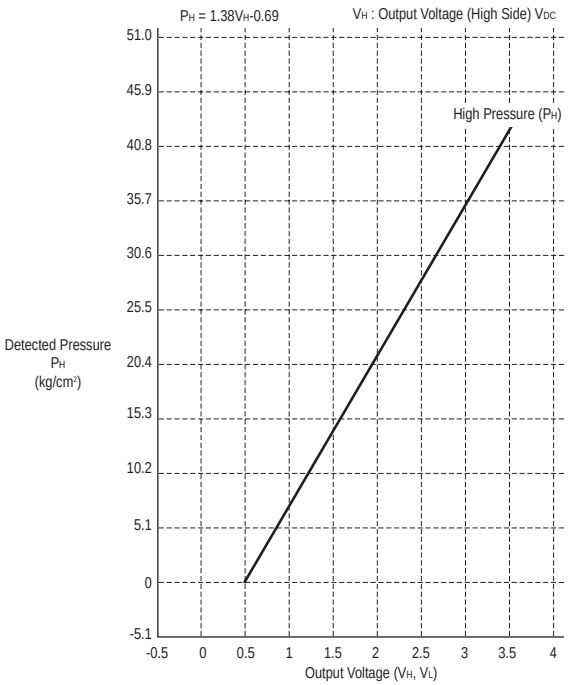




Check procedure

Electrical check

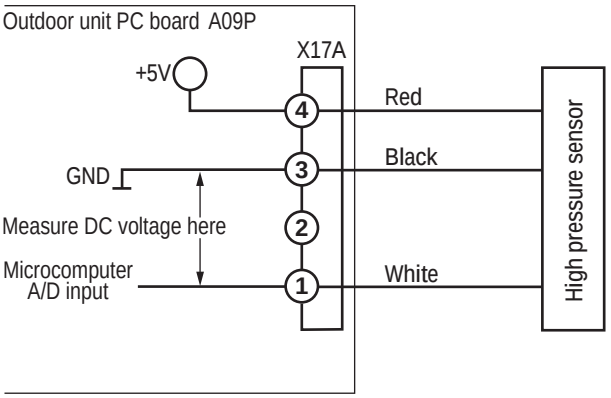
1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
3. Open the Sound Insulation (Front Side Only), refer to "Opening the sound insulation of the heat pump module (front side only)" on page 87.
4. Connect a pressure gauge to the high pressure service port and read the pressure.
5. From the graph below, determine the expected sensor output signal.



6. Power the Daikin Altherma GSHP.

> **INFORMATION**
> The high pressure sensor connector must be plugged into X17A on PCB A09P.

7. Measure the voltage across connector X17A: pin 1-3; compare the measured voltage with the expected voltage.



8. In case no voltage is measured across connector X17A: pin 1-3; do following checks:

9. Is PCB A09P powered?, if not check power supply.

10. Is connector X17A plugged in PCB A09P?, if not plug in X17A.

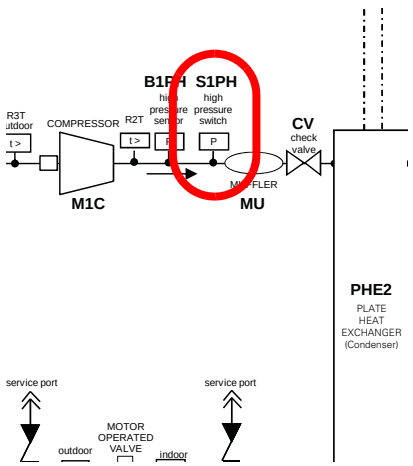
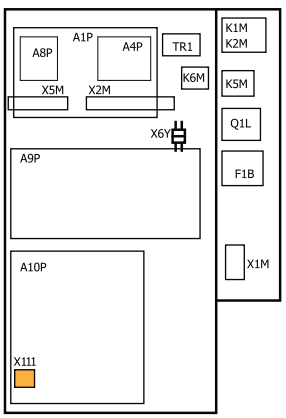
11. Is 5 VDC measured across connector X17A: pin 1-3?, if not replace PCB A09P.

    - In case all 3 checks above are OK but still no voltage is measured between X17: pin 1-3, replace the high pressure sensor B1PH, refer to "Replacing the refrigerant high pressure sensor" on page 135.

4.12. High pressure switch S1PH

Technical specification	Description
The high pressure sensor S1PH has a normally closed contact. If the pressure exceeds 41.7 (+0 / - 1) bar the contact will open; if the pressure drops below 32 (±2) bar the contact will close.	The high pressure switch S1PH is a safety component that stops the compressor if overpressure is detected in the refrigerant circuit.

Location

Piping diagram	Switch box	Unit
		

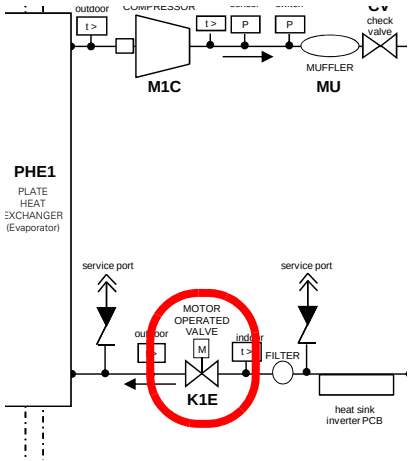
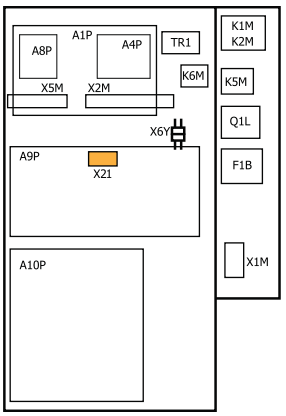
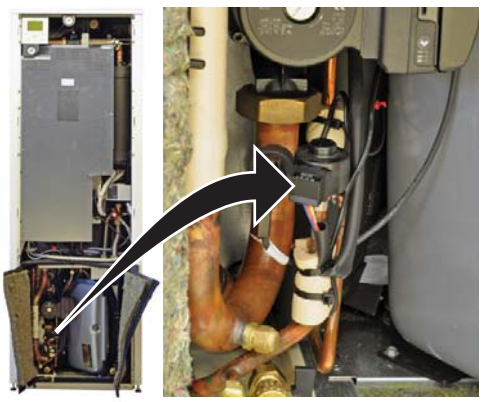
Check procedure

Electrical check

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the switch box cover, refer to the Daikin Altherma ground source heat pump Installer reference guide (EGSQH10S18AA9W).
3. Disconnect the connector X111A from PCB A10P.
4. Recover the refrigerant.
5. Pressurize the refrigerant circuit at 41.7 bar with nitrogen.
6. Measure the switch contacts between X111A: pin 1 and 2; the switch must be open.
7. Replace the high pressure switch S1PH if the contact is not open, refer to "Replacing the refrigerant high pressure switch" on page 138.
8. Lower the refrigerant circuit pressure to 30 bar.
9. Measure the switch contacts between X111A: pin 1 and 2; the switch must be closed.
10. Replace the high pressure switch S1PH if the contact is not closed, refer to "Replacing the refrigerant high pressure switch" on page 138.

4.13. Electronic expansion valve K1E

Technical specification	Description
The expansion valve K1E has a hermetically sealed body with a slide-on stepping motor drive coil (480 pulses from fully closed to fully open position).	The expansion valve K1E.

Location		
Piping diagram	**Switch box**	**Unit**
		

Check procedure

Blockage check

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Open the Sound Insulation (Front Side Only), refer to "Opening the sound insulation of the heat pump module (front side only)" on page 87.
3. Remove the electromagnet from the expansion valve K1E.

4. Slide the magnet (tool part N° 9950038) and gently rotate the magnet to manually operate the expansion valve K1E clockwise (closing) and counterclockwise (opening).

5. If it is not possible to open the expansion valve K1E with the magnet, the expansion valve K1E is blocked and the expansion valve K1E body must be replaced, refer to "Replacing the electronic expansion valve K1E body" on page 131.

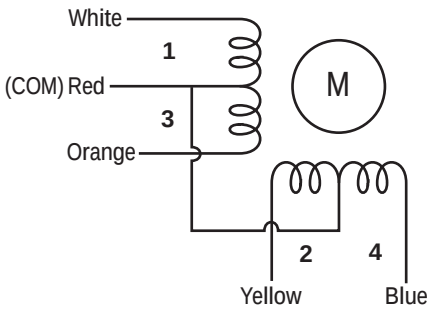
Electrical check

1. Switch off the Daikin Altherma GSHP via the user interface.

2. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.

3. Disconnect the connector X21A from PCB A9P.

4. Measure the 4 electromagnet windings X21: red - white, red orange, red - yellow and red - blue. All windings must read 45 Ohm.

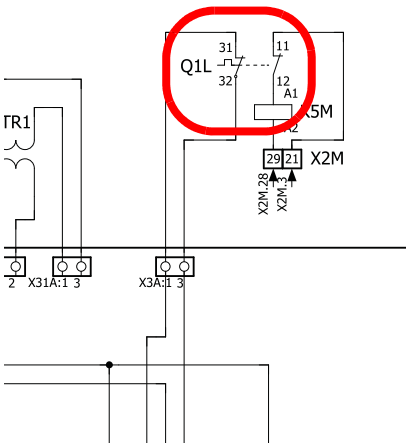
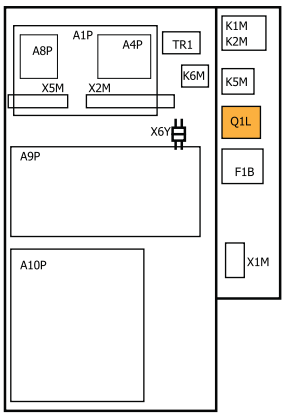
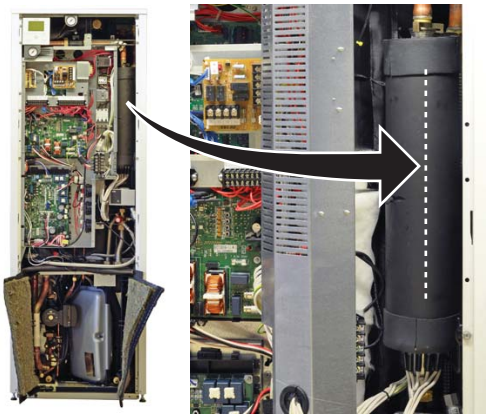


5. If one or more winding measurements fail, replace the expansion valve K1E electromagnet, refer to "Replacing the electronic expansion valve K1E electromagnet" on page 133.

4.14. Thermal protector backup heater Q1L

Technical specification	Description
The thermal protector backup heater Q1L is triggered if the temperature exceeds 92°C. The thermal protector backup heater Q1L will cut power supply to the backup heater to prevent the water circuit from overheating.	The thermal protector backup heater Q1L is a safety component that protects the water circuit against overtemperature.

Location

Wiring diagram	Switch box	Unit
		

Check procedure

Mechanical check

Visual check

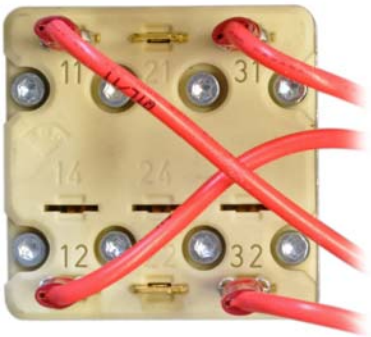
1. If thermal protector backup heater Q1L has tripped, press the red button to reset thermal protector backup heater Q1L.

Functional check

1. If required, check the thermal protector backup heater Q1L trip temperature by submerging the sensor in water.
2. Heat the water and measure the temperature of the water. The thermal protector backup heater Q1L must trip at approximately 92°C.

Electrical check

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
3. Remove the 2 screws that fix the thermal protector backup heater Q1L.
4. Disconnect the wiring from the thermal protector backup heater Q1L.

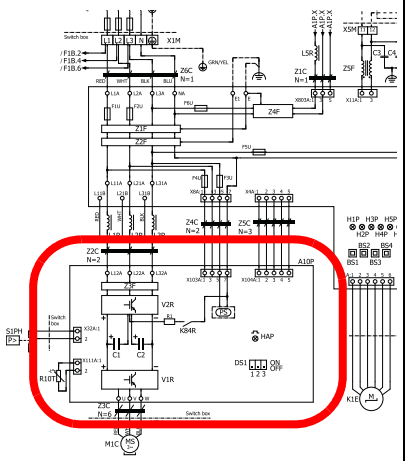
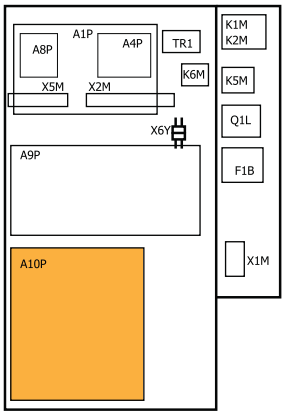
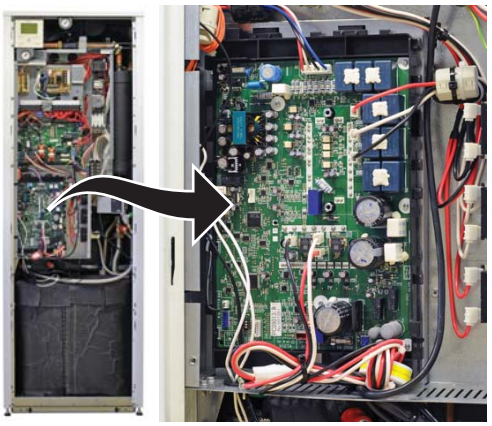


5. Measure the resistance between Q1L terminals 31 - 32 and measure the resistance between Q1L terminals 11 - 12, both contacts must be closed.
6. If one or more measurements fail, replace the thermal protector backup heater Q1L, refer to "Replacing the thermal protector backup heater" on page 107.

4.15. Inverter PCB A10P

Technical specification	Description
The inverter PCB A10P is a 400 V 3 phase inverter.	The inverter PCB A10P drives the compressor.

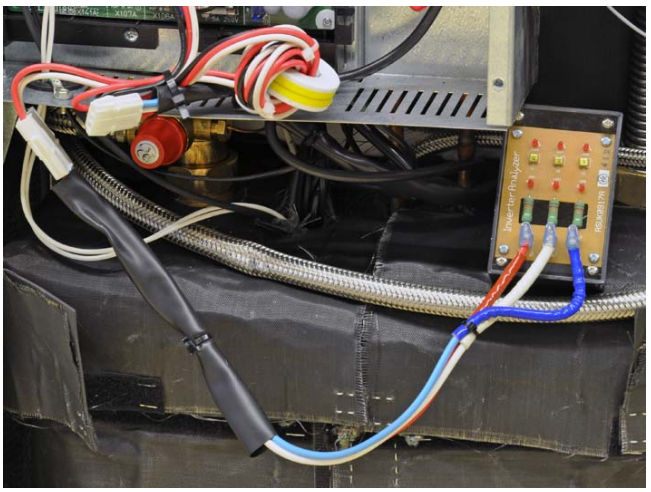
Location

Wiring diagram	Switch box	Unit
		

Check procedure

Electrical check

1. Switch off the Daikin Altherma GSHP with the field supplied power circuit breaker.
2. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
3. Disconnect X7Y and connect extension wire compressor (SPP number 5008826) to X7Y and to the Inverter Analyzer (SPP number 1368521).



4. Power the Daikin Altherma GSHP.

WARNING

Electrical shock hazard. Do not touch life wires.

5. Locate the LEDS on inverter PCB A10P:

LED status
● OFF
○ ON
◎ Blink

	H1P	H2P	H3P	H4P	H5P	H6P	H7P
Normal	●	●	●	●	●	●	●
6. press and hold BS1 for 5 seconds, *LED status (entered monitor mode)*	○	●	●	●	●	●	●
7. press BS2 twice, *LED status (after pressing BS2 twice)*	○	●	●	●	●	○	●
press BS3 once, *LED status (after pressing BS3)*	○	●	●	●	●	●	◎
press BS2 once, *LED status (after pressing BS2)*	○	●	●	●	●	◎	●
press BS3 once, *LED status (after pressing BS3)*	○	●	●	●	●	○	●
press BS3 once. *LED status (after pressing BS3)*	○	●	●	●	●	●	●

8. Check that all leds on the Inverter Analyzer are lit; if not, replace the inverter board, refer to "Procedure: replacing the A10P PCB" on page 95

9. Repeat step 7 to disable the inverter analyzer mode by disabling the setting (mode 2 - item 2 from binary 2 to binary 1) on PCB A10P.

10. Confirm that LED's on the inverter analyzer stopped blinking and wait for 10 seconds.

11. Switch off the main power to the unit.

12. Disconnect the inverter analyzer from the U V W wiring.

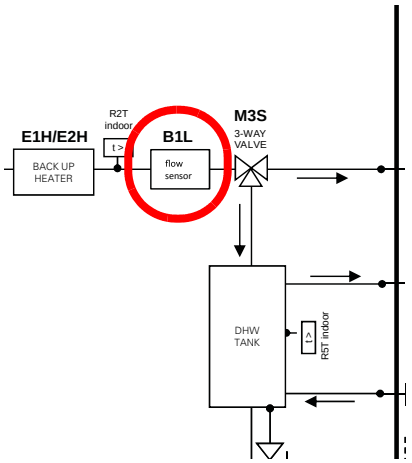
13. Re-connect the U V W leads to the compressor.

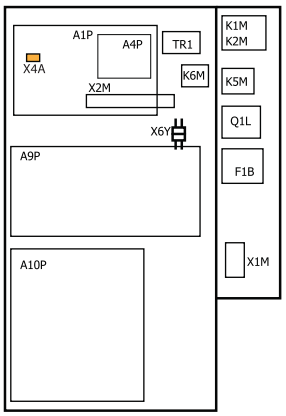
4.16. Water flow sensor B1L

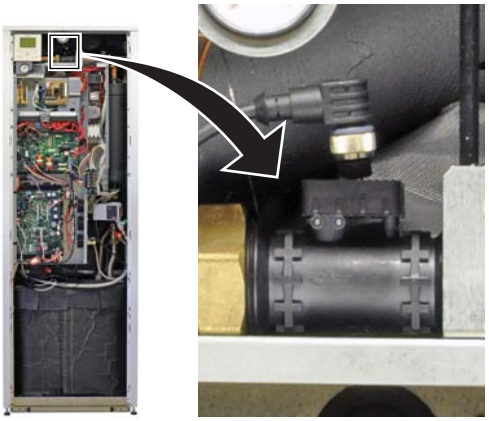
Technical specification	Description
The water flow sensor output signal versus flow is shown in the graph below.	The water flow sensor measures the flow in the water circuit.

Location

Piping diagram	Switch box	Unit







Check procedure

Mechanical check

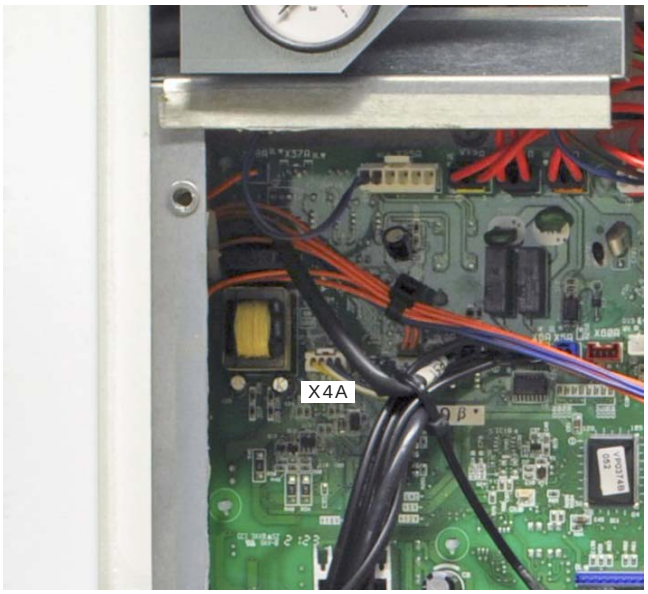
1. Check that the arrow on flow sensor B1L matches the flow direction (arrow must point to the left).

Electrical check

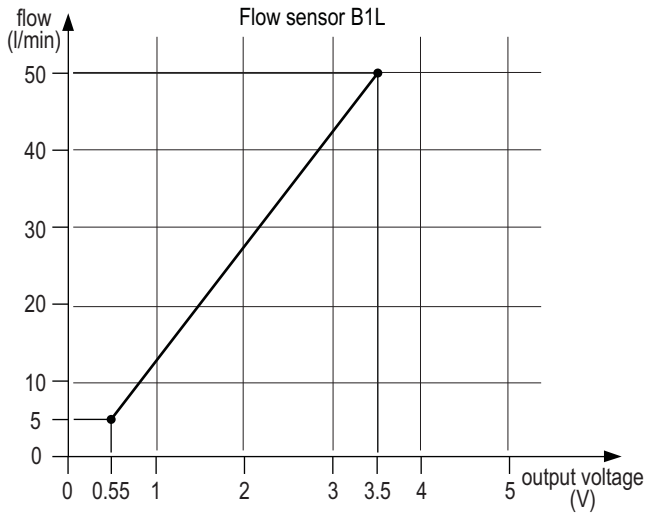
1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
3. Power the Daikin Altherma GSHP.
4. Activate “Installer level” on the user interface, refer to “Installer Level Settings” on the user interface are available in the Installer Reference Guide, paragraph To access the most used commands.
5. On the user interface, select Actuator test run A.7.4.
6. On the user interface, activate the water pump (A.7.4.6).
7. On the user interface, select Flow Rate 6.1.8.
8. The displayed flow rate must be between 10 and 40 l/minute.

INFORMATION

The flow sensor B1L connector must be plugged into X4A on PCB A01P.



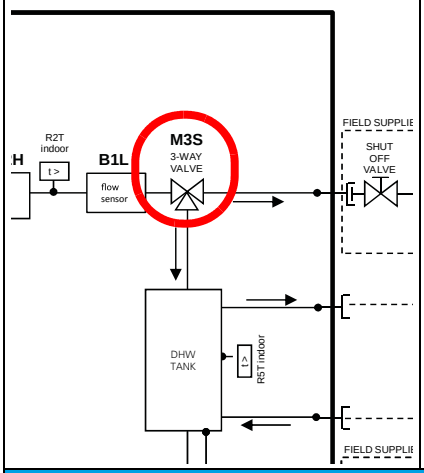
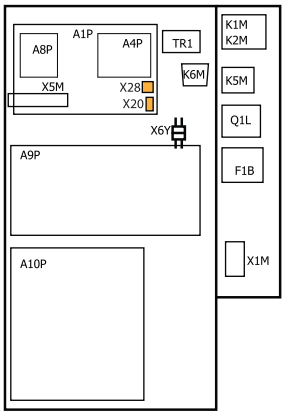
9. If the measured voltage is outside the expected range replace water flow sensor B1L, refer to "Replacing the water flow sensor" on page 102; if the measured voltage does not correspond with the displayed flow on the user interface, replace PCB A1P, refer to "Procedure: replacing the A1P PCB" on page 91.



4.17. 3-way valve M3S

Technical specification	Description
The 3-way valve is driven by a 230 VAC motor. Motor and valve can be replaced separately.	The 3-way valve is used to circulate the water in the water circuit through the domestic hot water tank or through the space heating circuit.

Location

Piping diagram	Switch box	Unit
		

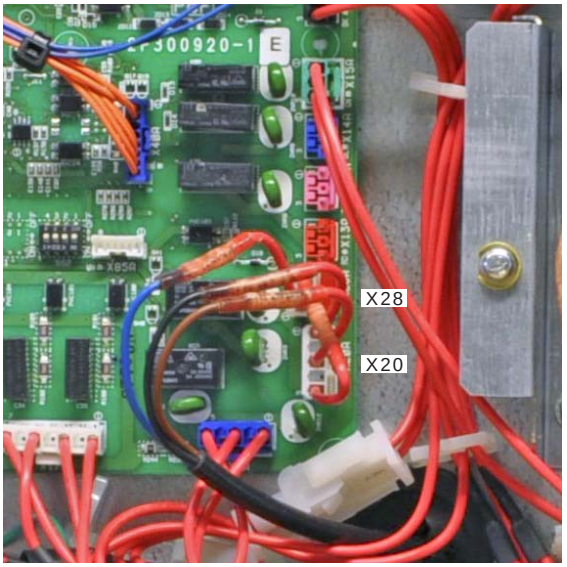
Check procedure

Mechanical check

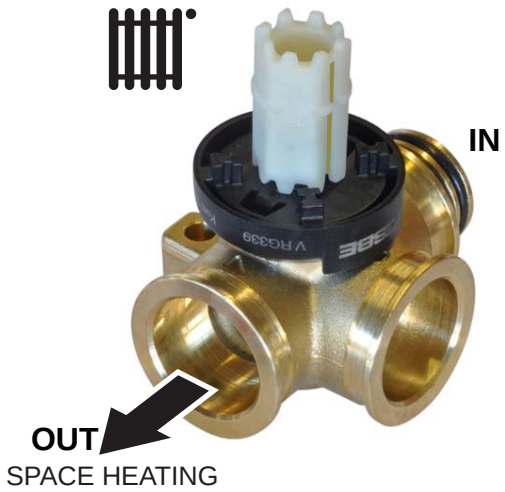
1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the top panel, refer to "Removing the top panel" on page 86.
3. Check that the knob is fully pressed (= motor control).
4. Check that the knob is either in domestic hot water or space heating position but not in an intermediate position.

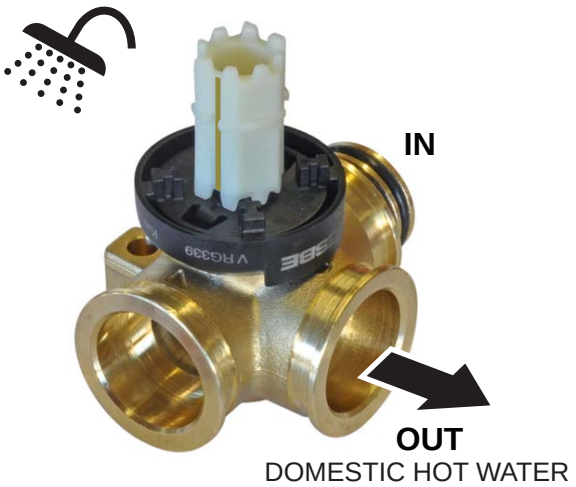
Electrical check

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the top panel, refer to "Removing the top panel" on page 86.
3. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
4. Power the Daikin Altherma GSHP and activate domestic hot water.



5. Measure the voltage on connector X28A: pin 1-3 on PCB A1P; if no 230 VAC is present:
   - check fuse FU1 on PCB A1P, replace if blown,
   - replace PCB A1P.
6. Measure the voltage on connector X28A: pin 2 and X20A: pin 1 on PCB A1P; if no 230 VAC is present, replace PCBA1P.
7. Using a contact thermometer, measure the temperature at the 3-way valve Domestic Hot Water exit and at the Space Heating exit; the Domestic Hot Water exit must have the same temperature as the 3-way valve input, the Space Heating exit must have a much lower temperature.
8. Activate Space Heating.
9. Measure the voltage on connector X28A: pin 2 and X20A: pin 5 on PCB A1P; if no 230 VAC is present, replace PCBA1P.
10. Using a contact thermometer, measure the temperature at the 3-way valve Domestic Hot Water exit and at the Space Heating exit; the Space Heating exit must have the same temperature as the 3-way valve input, the Domestic Hot Water exit must have a much lower temperature.
11. If one or both checks above are not OK, remove the 3-way valve motor from the 3-way valve.
12. Set the 3-way valve manually in the Domestic Hot Water position.
13. Using a contact thermometer, measure the temperature at the 3-way valve Domestic Hot Water exit and at the Space Heating exit; the Domestic Hot Water exit must have the same temperature as the 3-way valve input, the Space Heating exit must have a much lower temperature.
14. Set the 3-way valve manually in the Space Heating position.
15. Using a contact thermometer, measure the temperature at the 3-way valve Domestic Hot Water exit and at the Space Heating exit; the Domestic Hot Water exit must have the same temperature as the 3-way valve input, the Space Heating exit must have a much lower temperature.
16. If one or both checks above are not OK, the 3-way valve body must be replaced, refer to "Replacing the 3-way valve body" on page 126.
17. If both checks above are OK, the 3-way valve motor must be replaced, refer to "Replacing the 3-way valve motor" on page 123.


IN
OUT
SPACE HEATING


IN
OUT
DOMESTIC HOT WATER

Part 3. Repair

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Opening the sound insulation of the heat pump module (front side only) 87
Unlocking the pivoting power input section....88

1. General Repair procedures

1.1. Refrigerant handling procedures

- Make sure the applied pressure is never higher than the unit design pressure as indicated on the nameplate.
- Work according the F-gas regulation and/or local regulations.
- Make sure the correct amount (factory + additional where required) of refrigerant is charged after repair.
- Make sure to use the appropriate equipment and tools according to the refrigerant and unit type.
- Charge non-azeotropic refrigerant (e.g. R-410A) always in a liquid state.
- Make sure to use a digital scale (no charging cylinder).
- Execute correct vacuum drying procedure after repair work:
  - -0,1 MPa / -760 mmHg / -750 Torr for at least 1 hour.
  - Use both gas and liquid pipe connection.
  - Use related field setting where necessary.

Refer to "Refrigerant Handling" on page 84.

1.2. Pipe work procedures

- Make sure to cover open pipe ends during work so no dust or moisture can enter.
- Make sure to re-apply insulation removed during repair.
- Pipe expansion / flare making:
  - Remove any burrs on the cut surface and use correct tool such as reamer or scraper (note that excessive deburring can thin the pipe walls and cause cracking of the pipe).
  - Make sure the flare has the correct size (use a flare gauge).
  - Make sure no particles remain in the piping.
  - Apply refrigerant oil on the inner surface of the flare.
  - Make sure the flare connection is tightened with the correct torque (torque values refer to installation manual).
- Brazing:
  - Use correct brazing tool.
  - Use a phosphor copper filler metal (silver composition of 0 to 2%). Do not use flux material.
  - Use nitrogen replacement in order to prevent oxide film from forming (nitrogen purity ≥ 99,99%).
  - Do not stop the nitrogen gas until the refrigerant piping has completely cooled down.

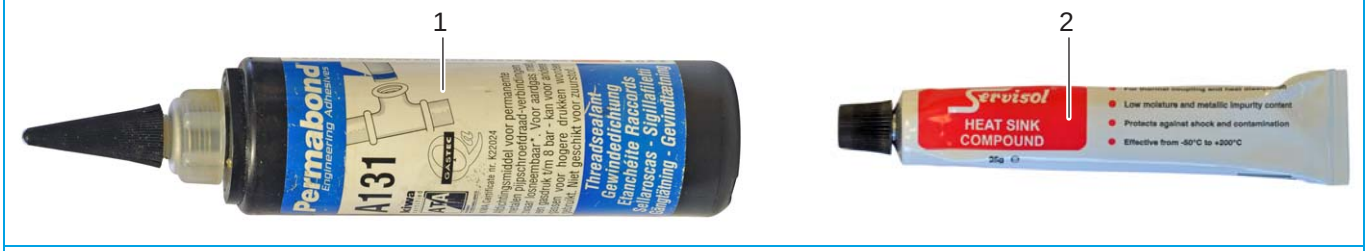
1.3. Products

1.3.1. Required products when servicing the Daikin Altherma GSHP

Some Daikin Altherma GSHP parts are sealed and must be sealed again after replacement. Only use the same thread sealant (1) whenever required.

When replacing R10T it might be necessary to apply some heat sink compound (2).

Figure 2 - Required products



1. Thread sealant (Permabond A131 local supply)
2. Heat sink compound (Part number 999300P)

1.4. Tools

1.4.1. Required special tooling when servicing the Daikin Altherma GSHP

Daikin strongly recommends to use special tools to avoid damage to the equipment or to facilitate the replacement of certain spare parts.

Figure 3 - Required tools

1. Cooling clamp
2. Pliers wrench (Knipex 86 03 300 or equivalent)
3. Pliers wrench (Knipex 87 05 300 or equivalent)
4. Welding blanket

2. Unit specific repair procedures

2.1. Unit specific refrigerant, brine and water procedures

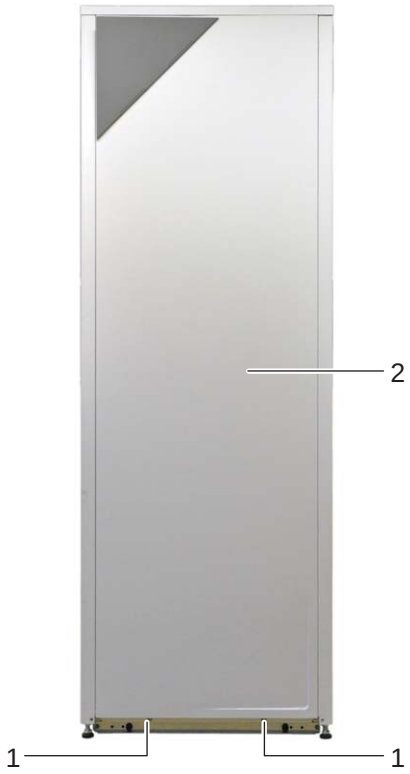
2.1.1. Removing the front panel

1. Switch off the Daikin Altherma GSHP via the user interface.

> **WARNING**
> The front panel is heavy. Be careful not to jam your fingers when opening the unit.

2. Loosen and remove the 2 screws (1) at the bottom of the unit that fix the front panel (2).
3. Slide the front panel of the unit downwards and remove it from the unit.

Figure 4 - Removing the front panel



1. Screw
2. Front panel

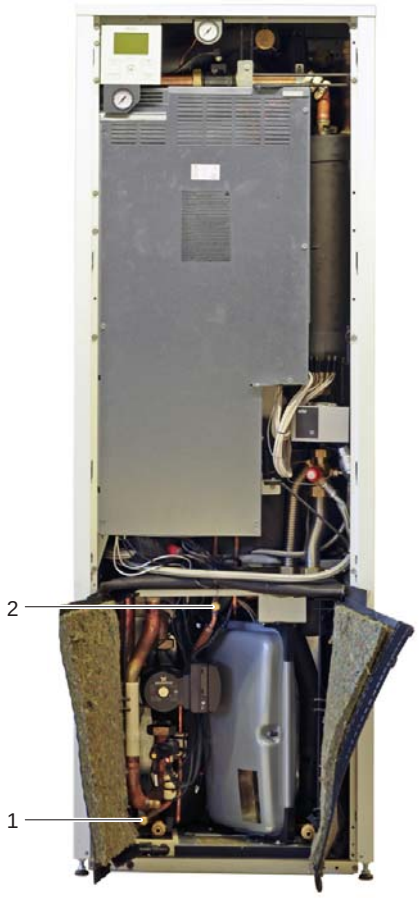
2.1.2. Refrigerant Handling

Refrigerant Action	High Pressure Service Port	Low Pressure Service Port
Recover	x	x
Vacuum	x	x
Charge	x	-

2.1.2.1 Procedure

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, "Removing the front panel" on page 83.
3. Open the sound insulation of the heat pump module (front side), refer to "Opening the sound insulation of the heat pump module (front side only)" on page 87.

Figure 5 - Refrigerant service ports



1. Low pressure service port
2. High pressure service port

2.1.3. Draining the brine circuit

WARNING

All hazardous waste shall be managed in accordance with federal, state and local regulations.

2.1.3.1 Procedure

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Open the sound insulation of the heat pump module (front side), refer to "Opening the sound insulation of the heat pump module (front side only)" on page 87.
3. Connect a hose to the brine circuit drain (1).

4. Put the other end of the hose in a recipient with a capacity of 10 liter.
5. Open the brine circuit drain valve DR1 (2) and wait until brine no longer exits the drain hose.
6. Close the brine circuit drain valve DR1 (2) and remove the hose from the brine circuit drain (1).

Figure 6 - Draining the brine circuit

1. Brine circuit drain
2. Brine circuit drain valve DR1

2.1.4. Air purge of the brine circuit

To perform an air purge or the brine circuit, refer to the instructions of the field supplied brine filling equipment.

2.1.5. Draining the water circuit

2.1.5.1 Procedure

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Close the field supplied water shut off valves.
3. Open the sound insulation of the heat pump module, refer to "Opening the sound insulation of the heat pump module (front side only)" on page 87.
4. Connect a hose to the water circuit drain (1).
5. Depressurize the water circuit by opening the water circuit pressure relief valve.
6. Open the water circuit drain valve DR4 (2).
7. Keep the water circuit pressure relief valve open to allow air to enter into the water circuit.

Figure 7 - Draining the water circuit

1. Water circuit drain	2. Water circuit drain valve DR4

2.1.6. Air purge of the space heating circuit

To perform an air purge, refer to “9.3 Air purge function on the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.1.7. Draining the domestic hot water tank

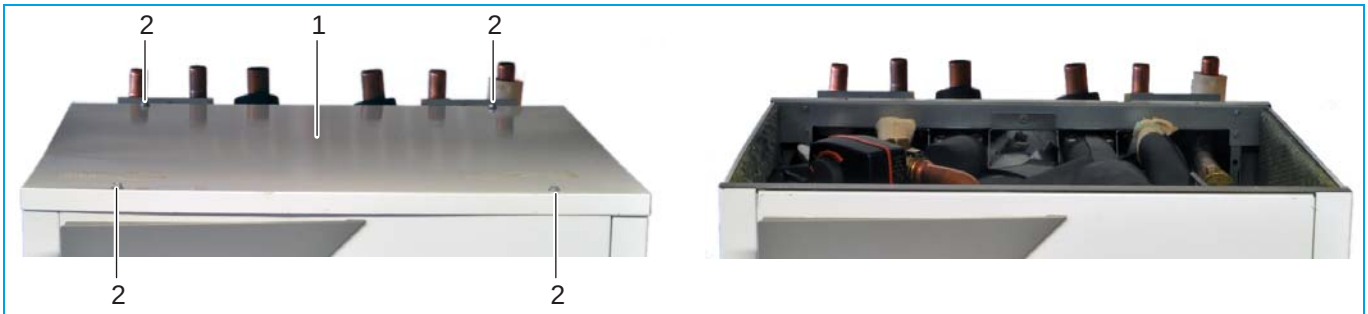
2.1.7.1 Procedure

To drain the domestic hot water tank, refer to “To drain the domestic hot water tank” in the Daikin Altherma ground source heat pump Installer reference guide.

2.1.8. Removing the top panel

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Loosen and remove the 4 screws (1) that fix the top panel.
3. Remove the top panel (2) from the Daikin Altherma GSHP.

Figure 8 - Removing the top panel



1. Screw	2. Top panel

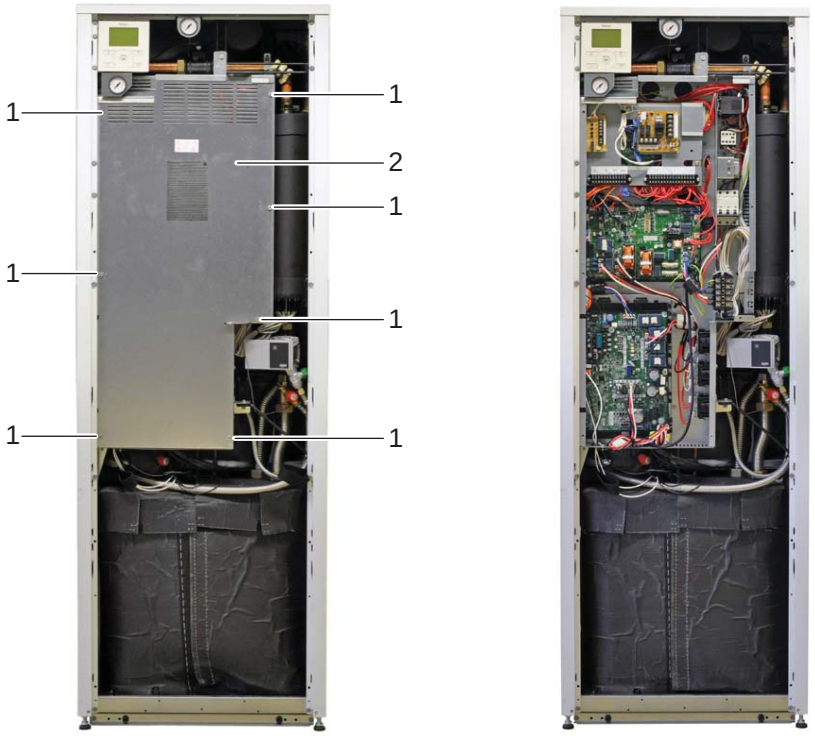
2.1.9. Removing the switch box cover

WARNING

Electrical shock hazard. Remove power from the Daikin Altherma GSHP before removing the switch box cover. Do not touch terminals.

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Loosen and remove the 7 screws (1) that fix the switch box cover (2).
3. Remove the switch box cover (2) from the Daikin Altherma GSHP.

Figure 9 - Removing the switch box cover



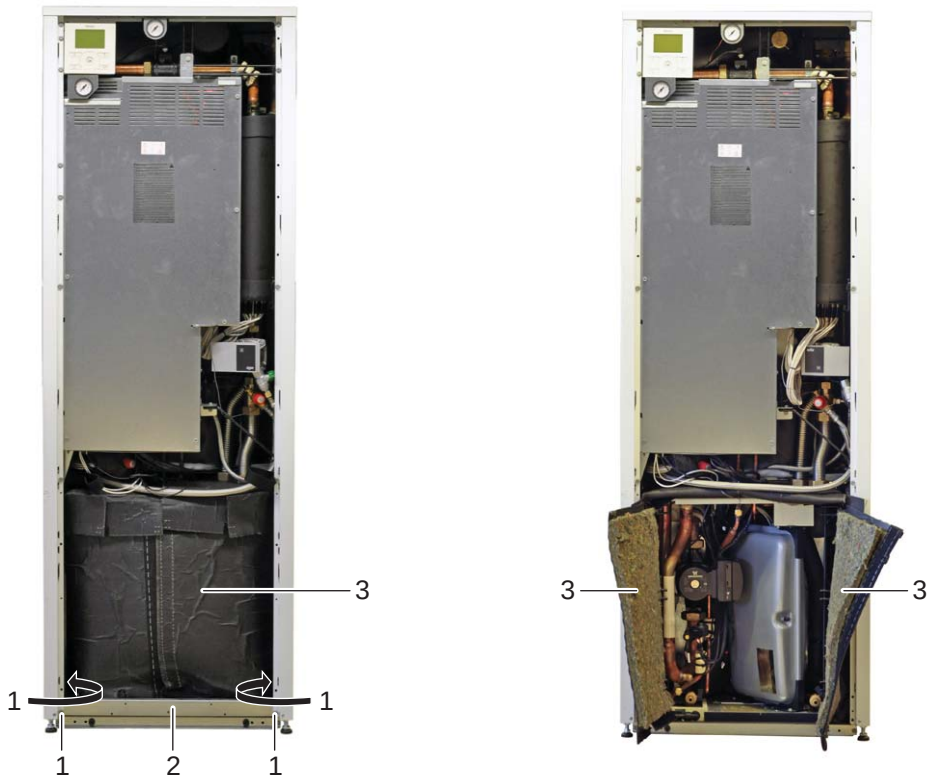
1. Screw
2. Switch box cover

2.1.10. Opening the sound insulation of the heat pump module (front side only)

2.1.10.1 Procedure

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Loosen and remove the 4 screws (1) that fix the bracket (2).
4. Remove the bracket (2).
5. Open the sound insulation (3) of the heat pump module by pulling the velcro strips.

Figure 10 - Opening the sound insulation of the heat pump module



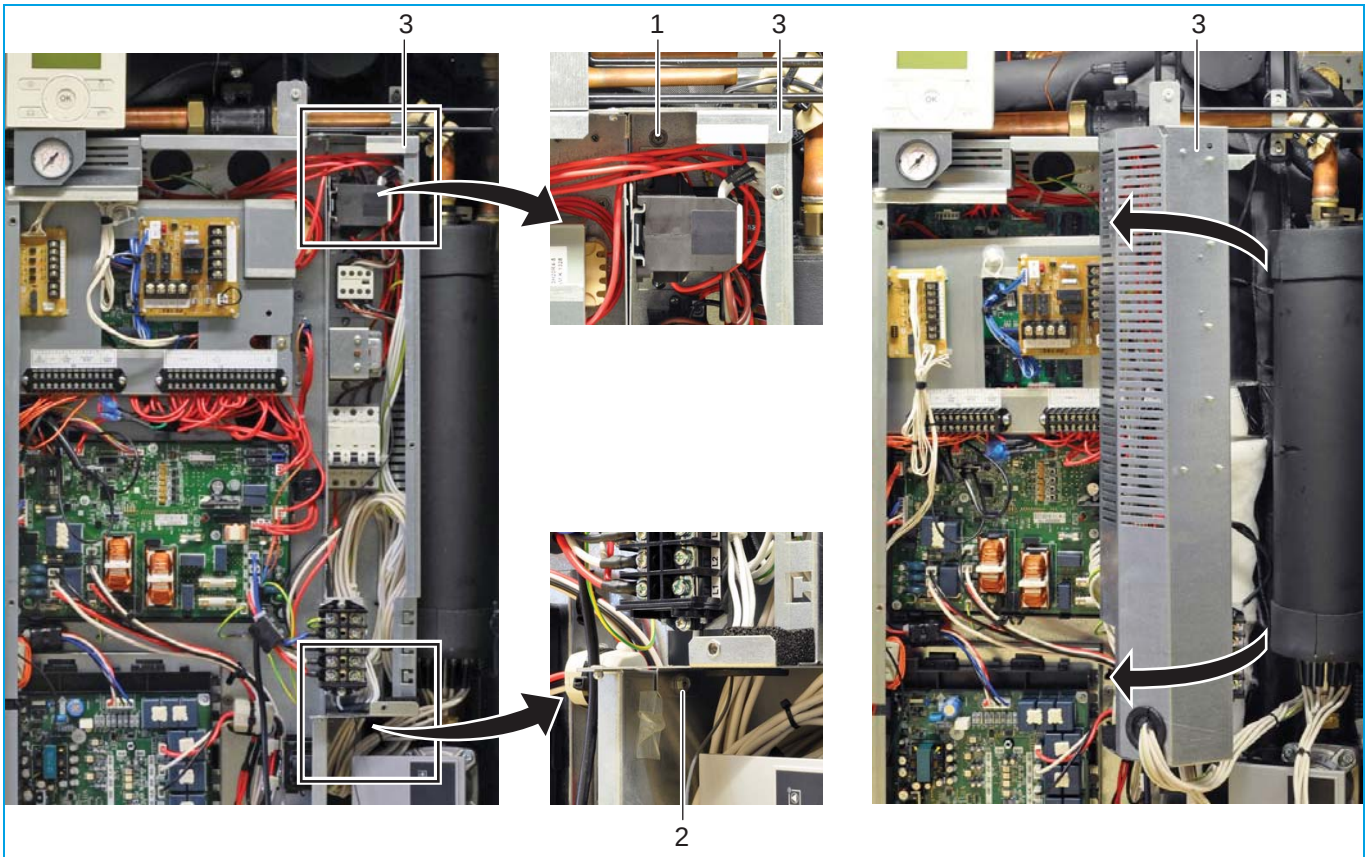
1. Screw
2. Bracket
3. Sound insulation

2.1.11. Unlocking the pivoting power input section

2.1.11.1 Procedure

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Loosen and remove the screw (1) that fixes the pivoting power input section (3) at the top.
4. Loosen and remove the screw (2) that fixes the pivoting power input section (3) at the side.

Figure 11 - Unlocking the pivoting power input section



1. Screw
2. Screw
3. Pivoting power input section

2.2. Parts replacement procedures

Overview of parts replacement procedures:

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Cleaning the brine filter....96
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2.2.1. Removing the lower rear panel

2.2.1.1 Preliminary actions

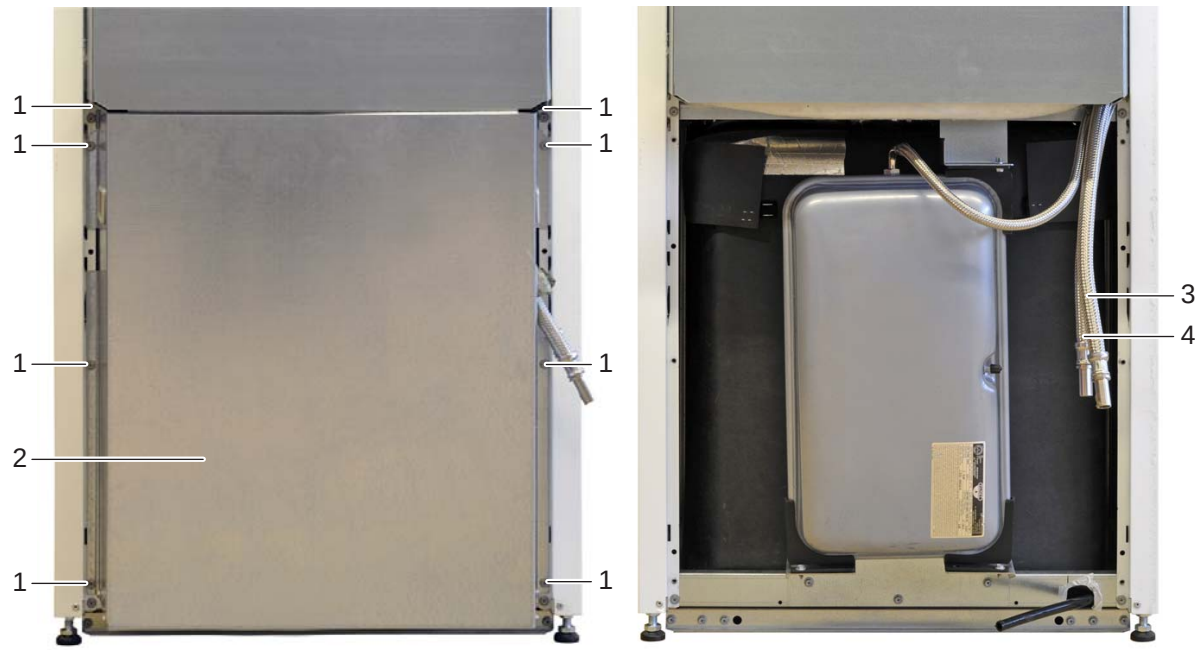
1. Switch off the Daikin Altherma GSHP via the user interface.
2. Shut off and disconnect the brine piping.
3. Shut off and disconnect the space heating piping.
4. Shut off and disconnect the domestic hot water piping.
5. Remove the front panel, refer to "Removing the front panel" on page 83.
6. Drain the domestic hot water tank, refer to "Draining the domestic hot water tank" on page 86.
7. Drain the brine circuit, refer to "Draining the brine circuit" on page 84.
8. Pull the Daikin Altherma GSHP from the wall to gain access to the rear panel.

2.2.1.2 Procedure

Removal

1. Loosen and remove the 8 screws (1) that fix the (lower) rear panel (2).
2. Remove the lower rear panel (2) while guiding the brine drain hose (3) and the domestic hot water drain hose (4) through the opening in the (lower) rear panel (2).

Figure 12 - Removing the lower rear panel



1. Screw	3. Brine drain hose
2. Lower rear panel	4. Domestic hot water drain hose

Installation

1. Proceed in reverse order.

2.2.2. Replacing a PCB in the switch box

WARNING

Electrical shock hazard. Remove power from the Daikin Altherma GSHP before removing the switch box cover. Do not touch terminals.

2.2.2.1 Preliminary actions

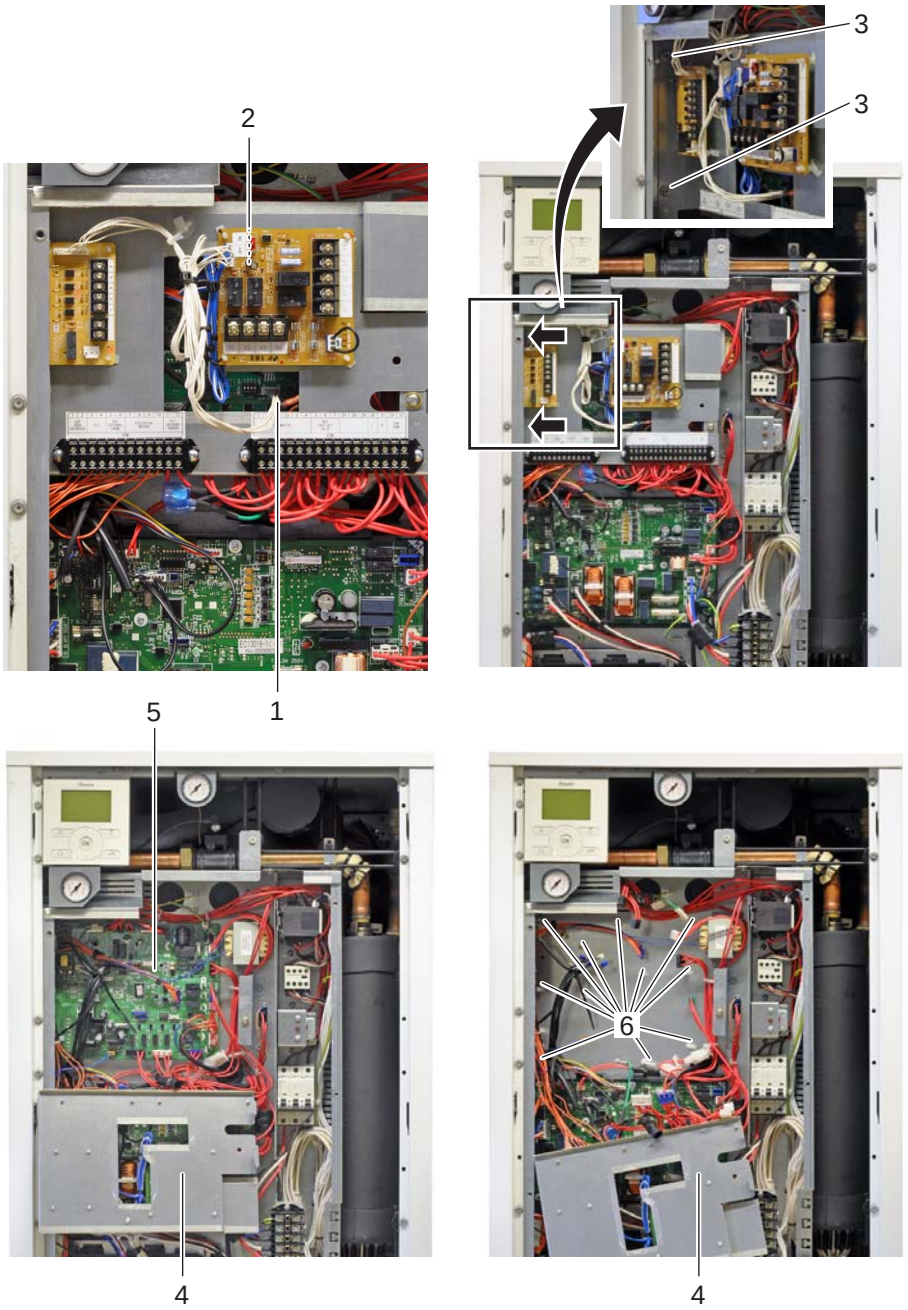
1. Switch off the Daikin Altherma GSHP with the field supplied circuit breaker.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.

2.2.2.2 Procedure: replacing the A1P PCB

Removal

1. Unplug connectors X33A (1) and X85A (2) from the A1P PCB (5).
2. Loosen and remove the 2 screws (3) that fix the fixation plate (4).
3. Detach the right side of the fixation plate (4).
4. Flip the fixation plate (4).
5. Unplug all connectors from the A1P PCB.
6. Carefully pull the A1P PCB (5) at the right side and unlatch the 11 pcb supports (6) one by one using a small pliers.
7. Remove the A1P PCB (5).

Figure 13 - Replacing the A1P PCB



1. X33A	4. Fixation plate
2. X85A	5. A1P PCB
3. Screw	6. PCB support

Installation

1. Proceed in reverse order.

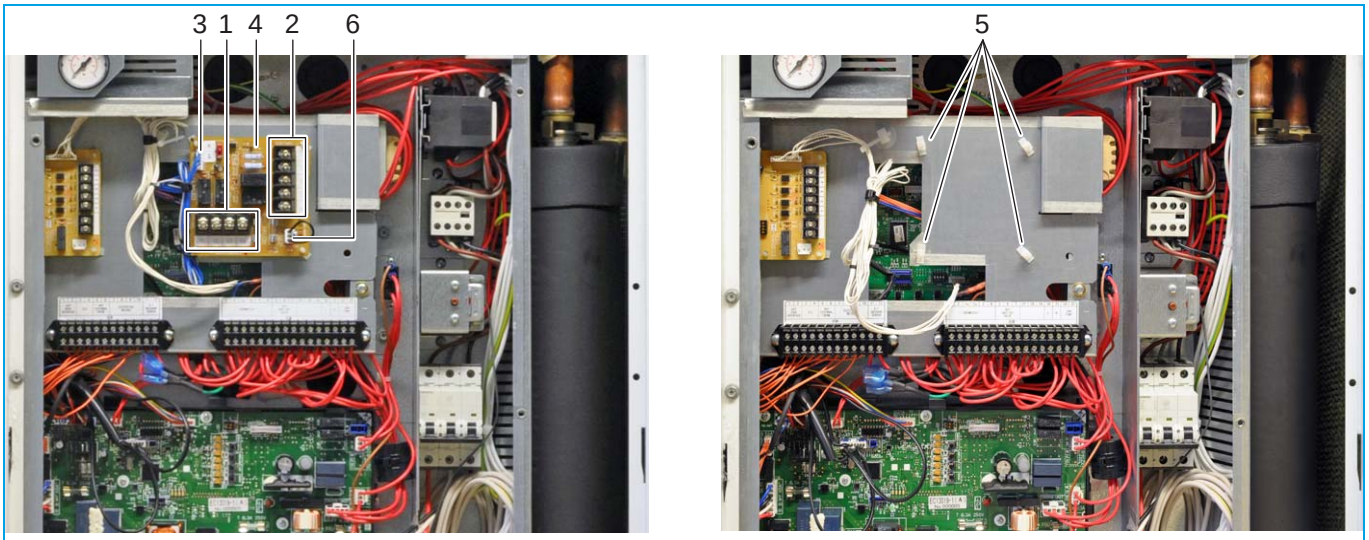
2.2.2.3 Procedure: replacing the A4P PCB

Removal

1. Unplug the connectors CN2 (3) from the A4P PCB.
2. If required, note the position of the wires connected to terminals X1-4 (1) and YC, Y1-4 (2) on A4P PCB (4).
3. Remove the field connected wiring on terminals X1-4 (1) and YC, Y1-4 (2) on A4P PCB (4).

4. Carefully pull the A4P PCB (4) at the right side and unlatch the 4 pcb supports (5) one by one using a small pliers.
5. Remove the A4 PCB (4).
6. Unplug the jumper wire from connector CN1 (6) on the A4P PCB.

Figure 14 - Replacing the A4P PCB



1. X1-4
2. YC, Y1-4
3. CN2
4. A4P PCB
5. PCB support
6. CN1

Installation

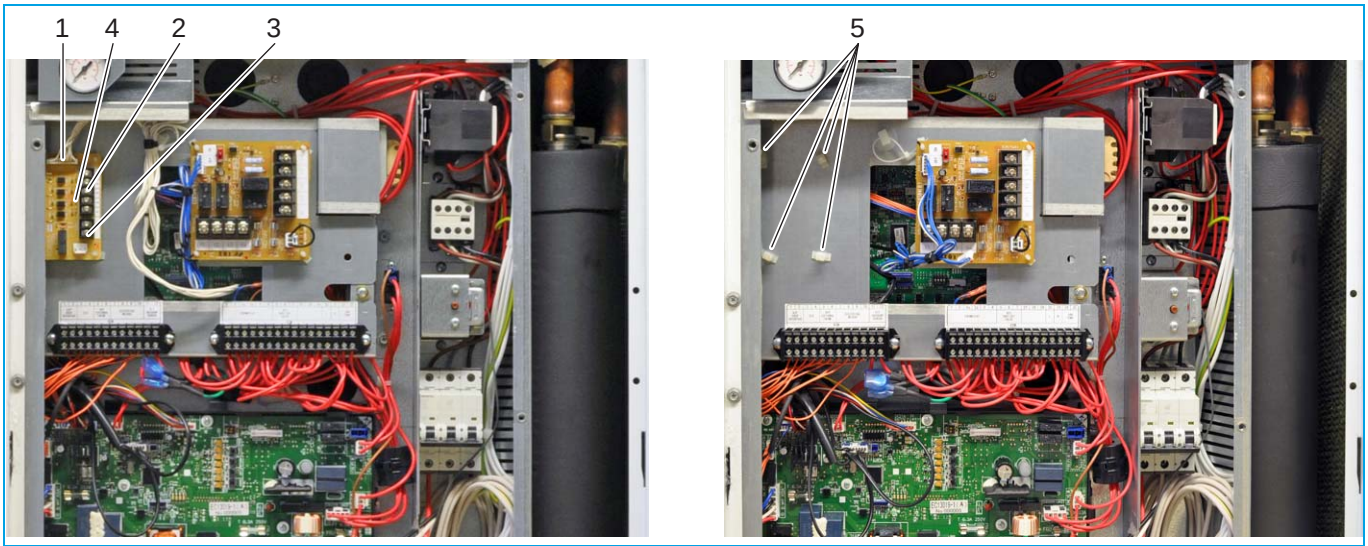
1. Proceed in reverse order.
2. Install the jumper wire on connector CN1 on the A4P PCB.

2.2.2.4 Procedure: replacing the A8P PCB

Removal

1. Unplug connector X80A (1) from the A8P PCB (4).
2. If required, note the position of the wires connected to terminals X800 (3) and X801M (2) on PCB A8P (4).
3. Remove the field connected wiring on terminals X800 (3) and X801M (2) on PCB A8P (4).
4. Carefully pull the PCB A8P (4) at the right side and unlatch the 4 PCB supports (5) one by one using a small pliers.
5. Remove the PCB A8P (4).

Figure 15 - Replacing the A8P PCB



1. X80A
2. X801 M
3. X800
4. A8P PCB
5. PCB support

Installation

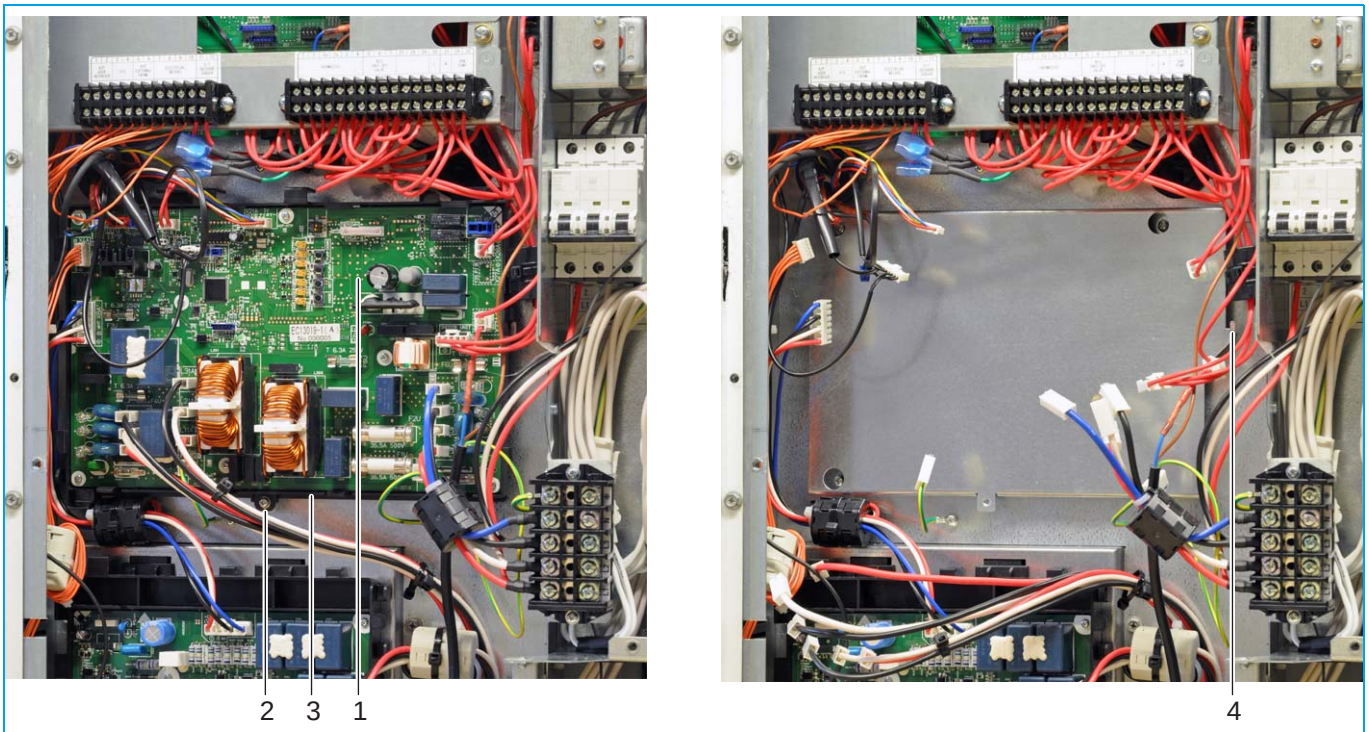
1. Proceed in reverse order.

2.2.2.5 Procedure: replacing the A9P PCB

Removal

1. Unplug all connectors from the A9P PCB (1).
2. Loosen and remove the screw (2) that fixes the A9P PCB frame (3) at the bottom.
3. Move the A9P PCB frame (3) upwards to unlatch it.
4. Remove the A9 PCB frame (3).

Figure 16 - Replacing the A9P PCB



1. A9P PCB	3. Frame
2. Screw	4. Catch

Installation

> **CAUTION**
> Before fixing the A9 PCB, check the PCB frame is locked by the catch.

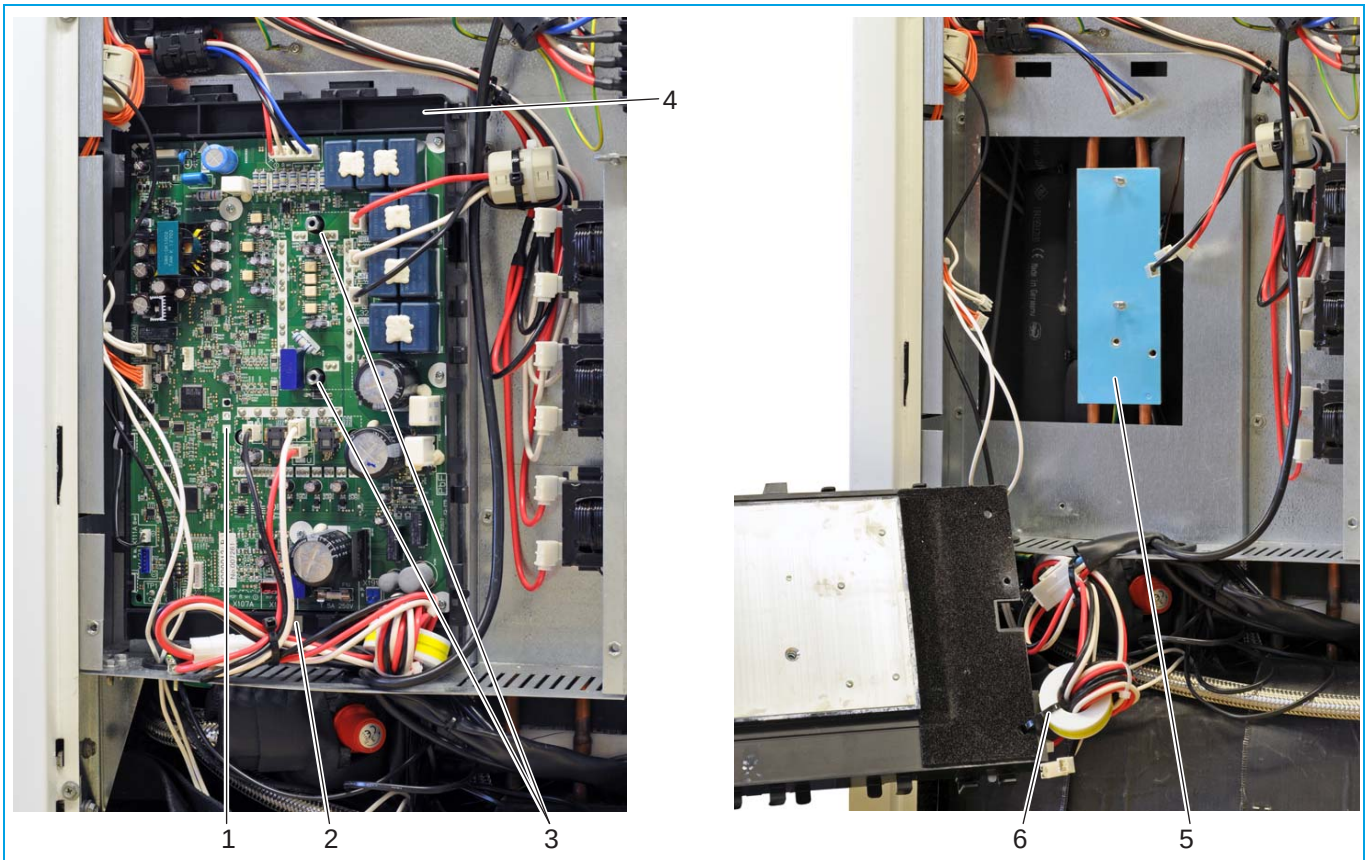
1. Proceed in reverse order.

2.2.2.6 Procedure: replacing the A10P PCB

Removal

1. Unplug all connectors from the A10P PCB (1).
2. Loosen and remove the screw (2) that fixes the A10P PCB frame (4) at the bottom.
3. Loosen and remove the 2 hex coupling nuts (3) that fix the A10P PCB (1) to the heat sink (5).
4. Move the A10P PCB frame (4) upwards to unlatch it.
5. Flip the A10P PCB frame (4) to access the tie wrap.
6. Cut the tie wrap (6) and remove the A10P PCB.
7. Remove the A10 PCB (1).

Figure 17 - Replacing the A10P PCB



1. A10P PCB
2. Screw
3. Hex coupling nut
4. Frame
5. Heat sink
6. Tie wrap

Installation

1. Proceed in reverse order.

2.2.3. Cleaning the brine filter

WARNING

All hazardous waste shall be managed in accordance with federal, state and local regulations.

2.2.3.1 Preliminary actions

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Remove the top panel, refer to "Removing the top panel" on page 86.
4. Partially drain the brine circuit, refer to "Draining the brine circuit" on page 84.

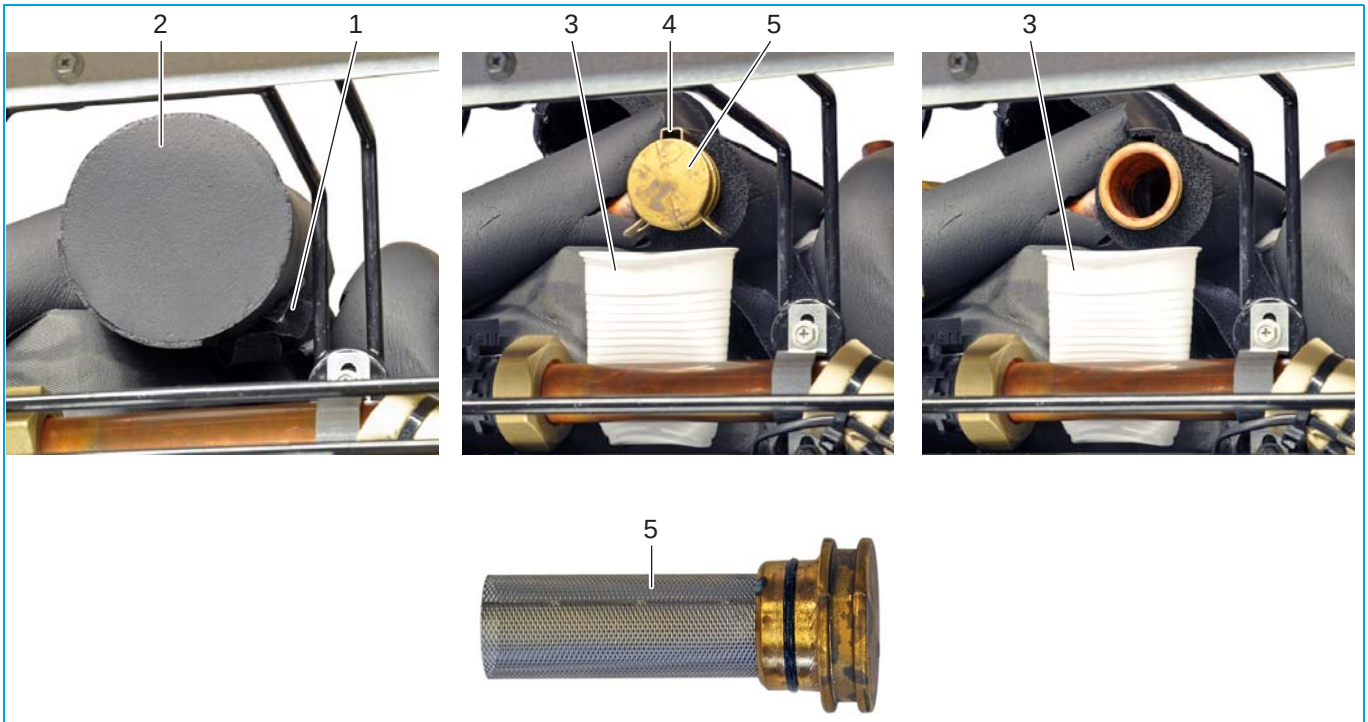
2.2.3.2 Procedure

Removal

> **CAUTION**
> Although the brine circuit is partially drained, some brine may be spilled when removing the brine filter. Always wipe off spilled brine.

1. Pull the velcro strip (1) to release the brine filter insulation (2).
2. Tip over the brine filter insulation (2).
3. Place a recipient (3) under the brine filter (5).
4. Remove the clip (4) that fixes the brine filter (5).
5. Pull the brine filter (5) to remove it from the filter housing.
6. Clean the brine filter (5) with water and a soft brush.

Figure 18 - Cleaning the brine filter

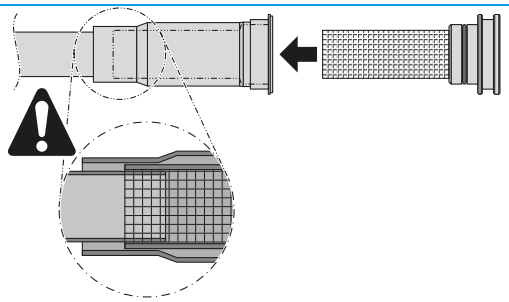


1. Velcro strip
2. Brine filter insulation
3. Recipient
4. Clip
5. Brine filter

Installation

> **CAUTION**
> Handle the brine filter with care. Do NOT use excessive force when reinserting the brine filter so as NOT to damage the mesh.

Figure 19 - Brine filter installation



1. Proceed in reverse order.
2. Fill the brine circuit, refer to “To fill the brine circuit” in the Daikin Altherma ground source heat pump Installer reference guide.
3. Check the brine concentration.

2.2.4. Cleaning the water filter

2.2.4.1 Preliminary actions

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Remove the top panel, refer to "Removing the top panel" on page 86.
4. Partially drain the water circuit, refer to "Draining the water circuit" on page 85.

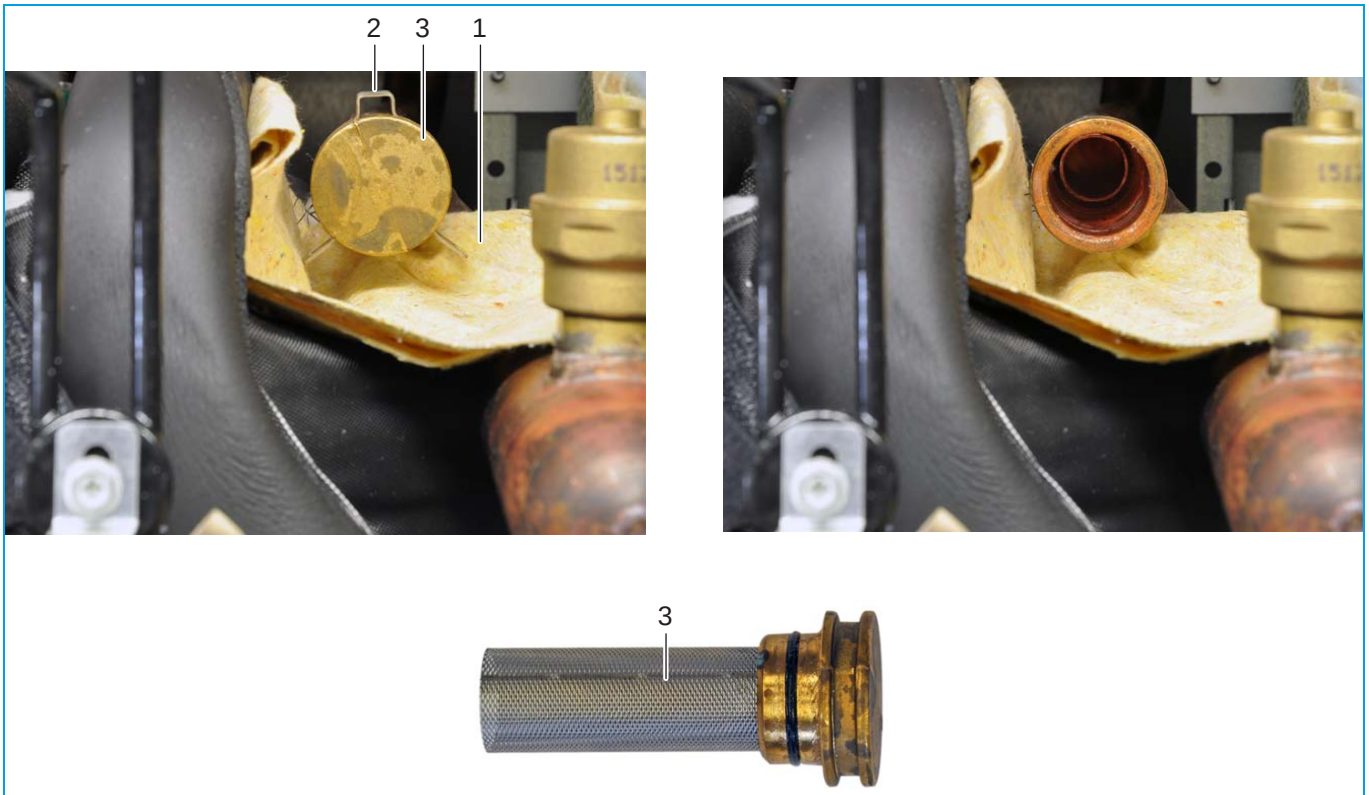
2.2.4.2 Procedure

Removal

	CAUTION Although the water circuit is partially drained, some water may be spilled when removing the water filter. Always wipe off spilled water.

1. Place a cloth (1) under the water filter (3).
2. Remove the clip (2) that fixes the water filter (3).
3. Pull the water filter (3) to remove it from the filter housing.
4. Clean the water filter (3) with water and a soft brush.

Figure 20 - Cleaning the water filter



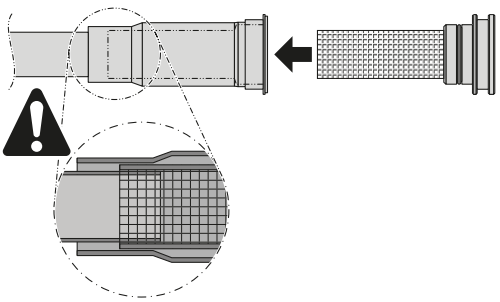
1. Cloth
2. Clip
3. Water filter

Installation

CAUTION

Handle the water filter with care. Do NOT use excessive force when you reinsert the water filter so as NOT to damage the mesh.

Figure 21 - Water filter installation



1. Proceed in reverse order.
2. Fill the water circuit, refer to “To fill the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.
3. Purge the water circuit, refer to “9.3 Air purge function on the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.2.5. Replacing the brine flow switch

2.2.5.1 Preliminary actions

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
4. Drain the brine circuit, refer to "Draining the brine circuit" on page 84.

2.2.5.2 Procedure

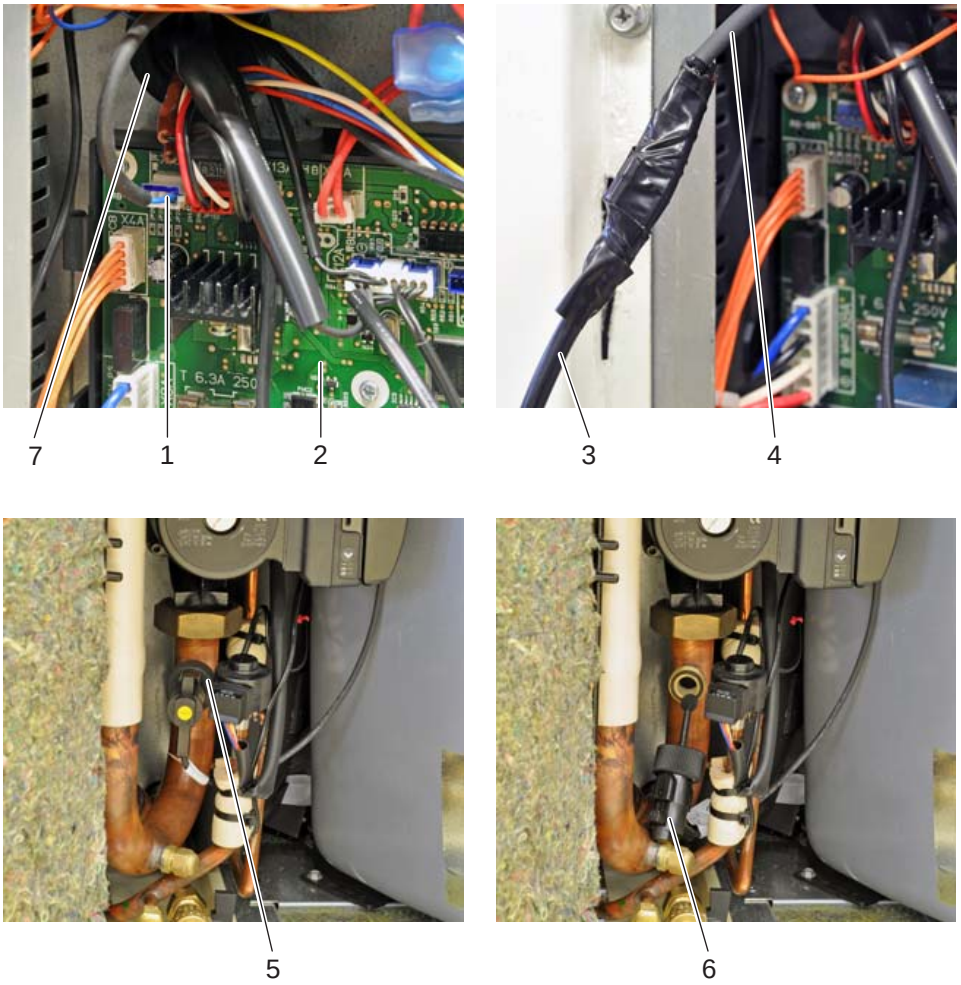
INFORMATION

The brine flow switch wire is replaced together with the brine flow switch. To facilitate the installation of new brine flow switch, a pull line must be attached to the brine flow switch wire before removal.

Removal

1. Unplug connector X18A (1) from the A10P PCB (2).
2. Attach a pull line (3) of approximately 2 meter to the brine flow switch wire (4).
3. Loosen the nut (5) that fixes the brine flow switch (6).
4. While guiding the pull line (3) through the grommet (7), pull the brine flow switch wire (4) until the pull line (3) surfaces at the bottom of the Daikin Altherma GSHP.
5. Detach the pull line (3) from the brine flow switch wire (4).
6. Remove the brine flow switch (6).

Figure 22 - Replacing the brine flow switch



1. Connector X18A
2. A10P PCB
3. Pull line
4. Brine flow switch wire
5. Nut
6. Brine flow switch
7. Grommet

Installation

CAUTION

The brine flow switch paddle must be mounted vertically with the wire exiting at the bottom.

INFORMATION

Use the pull line (3) to guide the brine flow switch wire (4) from the bottom of the Daikin Altherma GSHP through the grommet (7) next to connector X18A (1) on A10P PCB (2).

1. Proceed in reverse order.
2. Fill the brine circuit, refer to “To fill the brine circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.2.6. Replacing the water flow sensor

2.2.6.1 Preliminary actions

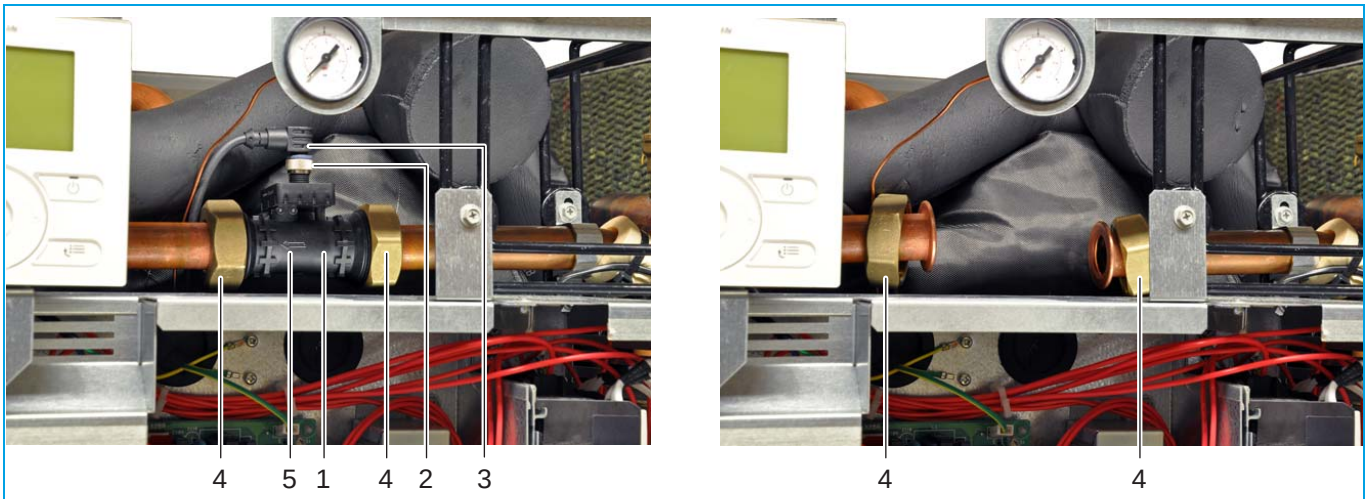
1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Partially drain the water circuit, refer to "Draining the water circuit" on page 85.

2.2.6.2 Procedure

Removal

1. Loosen the water flow sensor connector nut (2).
2. Unplug the water flow sensor connector (3).
3. Loosen the 2 nuts (4) that fix the water flow sensor (1).
4. Remove the water flow sensor (1).
5. Wipe off any spilled water.

Figure 23 - Replacing the water flow sensor



1. Water flow sensor
2. Water flow sensor connector nut
3. Water flow sensor connector
4. Nut
5. Arrow (flow direction)

Installation

> **INFORMATION**
> The arrow (5) indicating the water flow direction must point to the LEFT.

1. Proceed in reverse order.
2. Fill the water circuit, refer to “To fill the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.
3. Purge the water circuit, refer to “9.3 Air purge function on the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.2.7. Replacing the brine pump

2.2.7.1 Preliminary actions

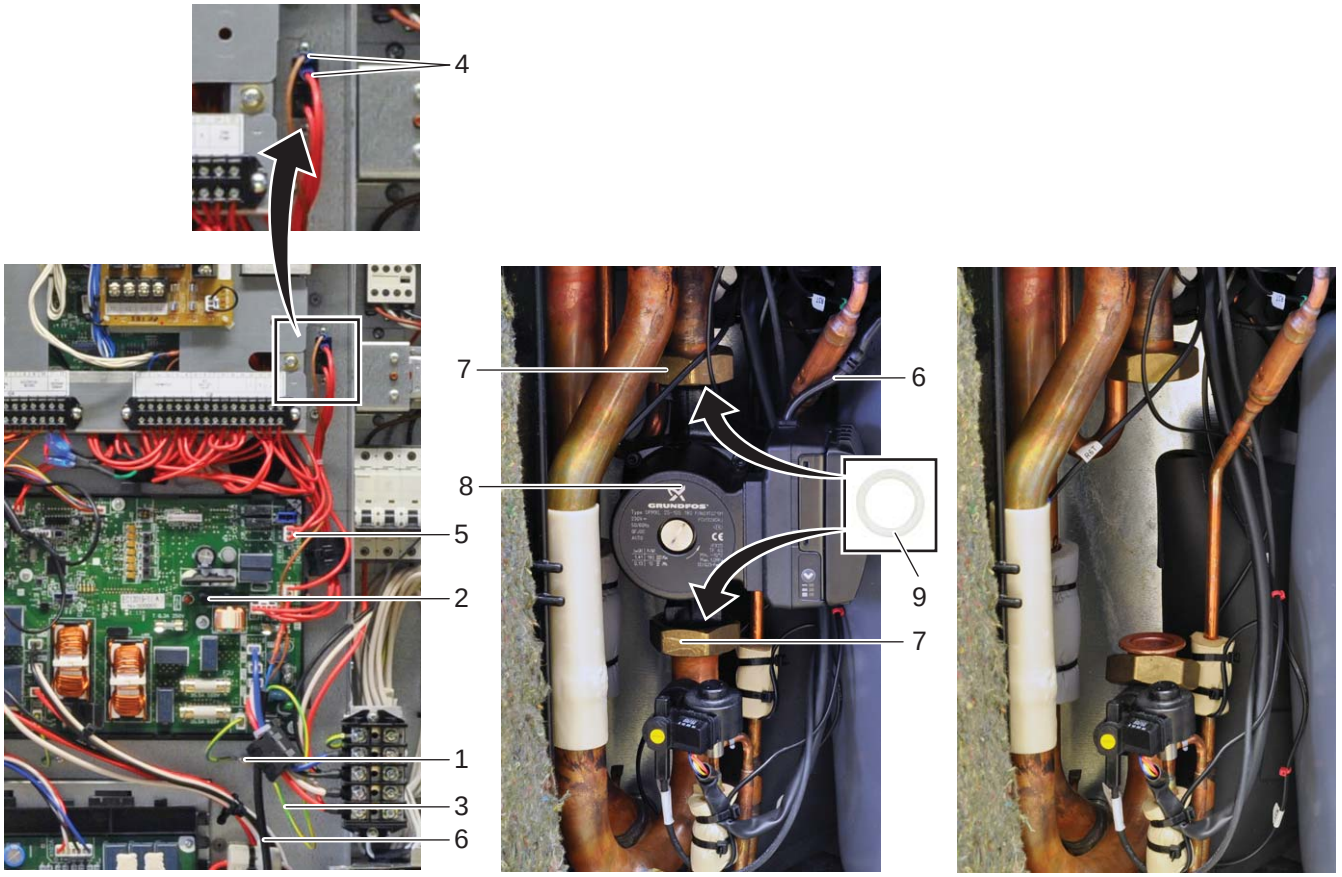
1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
4. Open the Sound Insulation of the heat pump module (front side only), "Opening the sound insulation of the heat pump module (front side only)" on page 87.
5. Drain the brine circuit, refer to "Draining the brine circuit" on page 84.

2.2.7.2 Procedure

Removal

1. Unplug the connector X77A (5) from the A9P PCB (2).
2. Unplug the 2 Faston connectors from brine pump relay K6M terminals 3-4 (4).
3. Loosen and remove the screw (1) that fixes the brine pump ground wire (3) to the chassis.
4. Guide the brine pump wire (6) through the grommet at the bottom of the switch box.
5. Loosen the nuts (7) that fix the brine pump.
6. Remove the brine pump (8).
7. Remove the seals (9) from the nuts (7).

Figure 24 - Replacing the brine pump



1. Screw
2. A9 PCB
3. Brine pump ground wire
4. K6M contacts 3-4
5. X77A
6. Brine pump wire
7. Nut
8. Brine pump
9. Seal

Installation

> **CAUTION**
> Make sure to connect the brine pump ground wire and the A9P PCB ground wire to the chassis. If damaged, replace the seals.

1. Proceed in reverse order.
2. Fill the brine circuit, refer to “To fill the brine circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.2.8. Replacing the backup heater

2.2.8.1 Preliminary actions

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
4. Unlock the power input section, refer to "Unlocking the pivoting power input section" on page 88.
5. Drain the water circuit, refer to "Draining the water circuit" on page 85.

2.2.8.2 Procedure

> **INFORMATION**
>
> Note the position of the backup heater, water pump, pressure relief valve and the corrugated pipe.
>
> After installation of the backup heater, it must be possible to remove the thermal protector backup heater without removing the backup heater.

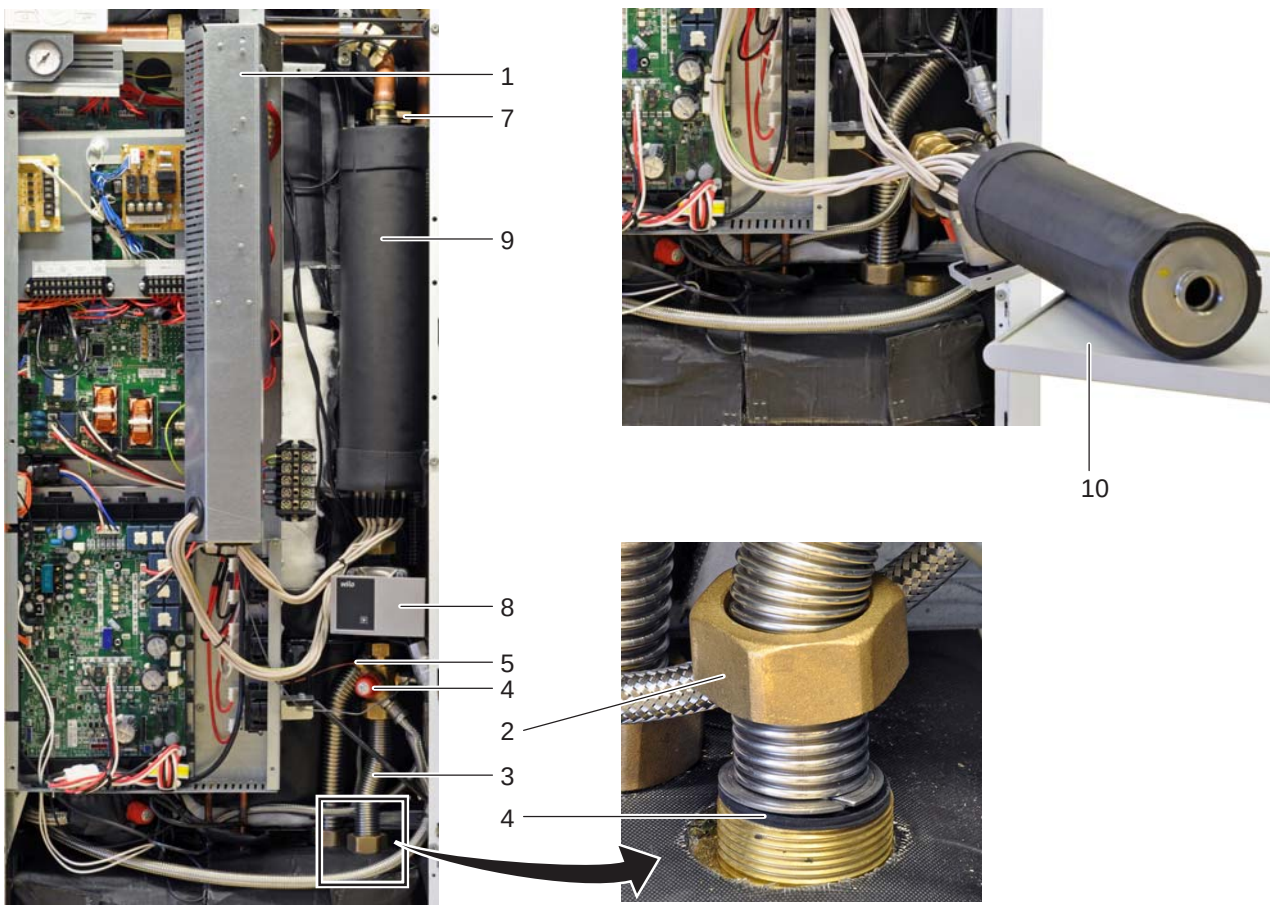
Removal

1. Turn the pivoting power input section (3) to the left, refer to "Unlocking the pivoting power input section" on page 88.
2. Loosen the lower nut (1) from the corrugated pipe (2).
3. Remove the seal (3) from the corrugated pipe (2).
4. Loosen the nut (4) that fixes the water manometer to the water pressure relief valve (5).
5. Remove the clip (6) that fixes the backup heater (8) to the domestic hot water circuit.

> **CAUTION**
>
> The backup heater is still connected to the Daikin Altherma GSHP.

6. Remove the backup heater (8), water pump (7), pressure relief valve (5) and the corrugated pipe (2) from the Daikin Altherma GSHP and lay it on a support (9).

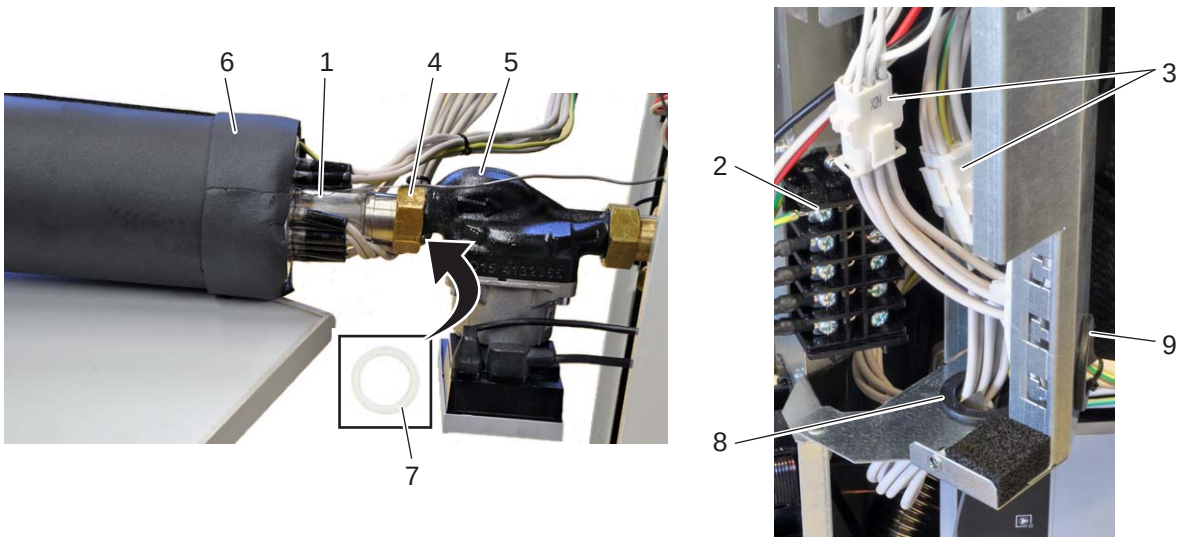
Figure 25 - Replacing the backup heater - 1



1. Lower nut
2. Corrugated pipe
3. Seal
4. Nut
5. Pressure relief valve
6. Clip
7. Water pump
8. Backup heater
9. Support
10. Pivoting power input section

7. Remove the thermal protector backup heater (1) from the backup heater (6).
8. Remove the backup heater wiring from behind X1M (2).
9. Unplug the connectors X1H and X2H (3).
10. Guide the wire with connector X2H (3) through the pivoting power input section bottom grommet (8).
11. Guide the wire with connector X1H (3) through the pivoting power input section side grommet (9).
12. Loosen the nut (4) that fixes the domestic hot water pump (5) to the backup heater (6).
13. Remove the seal (7).

Figure 26 - Replacing the backup heater - 2



1. Thermal protector backup heater Q1L
2. X1M
3. X1H, X2H
4. Nut
5. Water pump
6. Backup heater
7. Seal
8. Bottom grommet
9. Side grommet

Installation

INFORMATION

After installation, the backup heater positioning must allow to remove the thermal protector backup heater without removing the backup heater. If damaged, replace the seals.

1. Proceed in reverse order.
2. Fill the water circuit, refer to “To fill the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.
3. Purge the water circuit, refer to “9.3 Air purge function on the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.2.9. Replacing the thermal protector backup heater

2.2.9.1 Preliminary actions

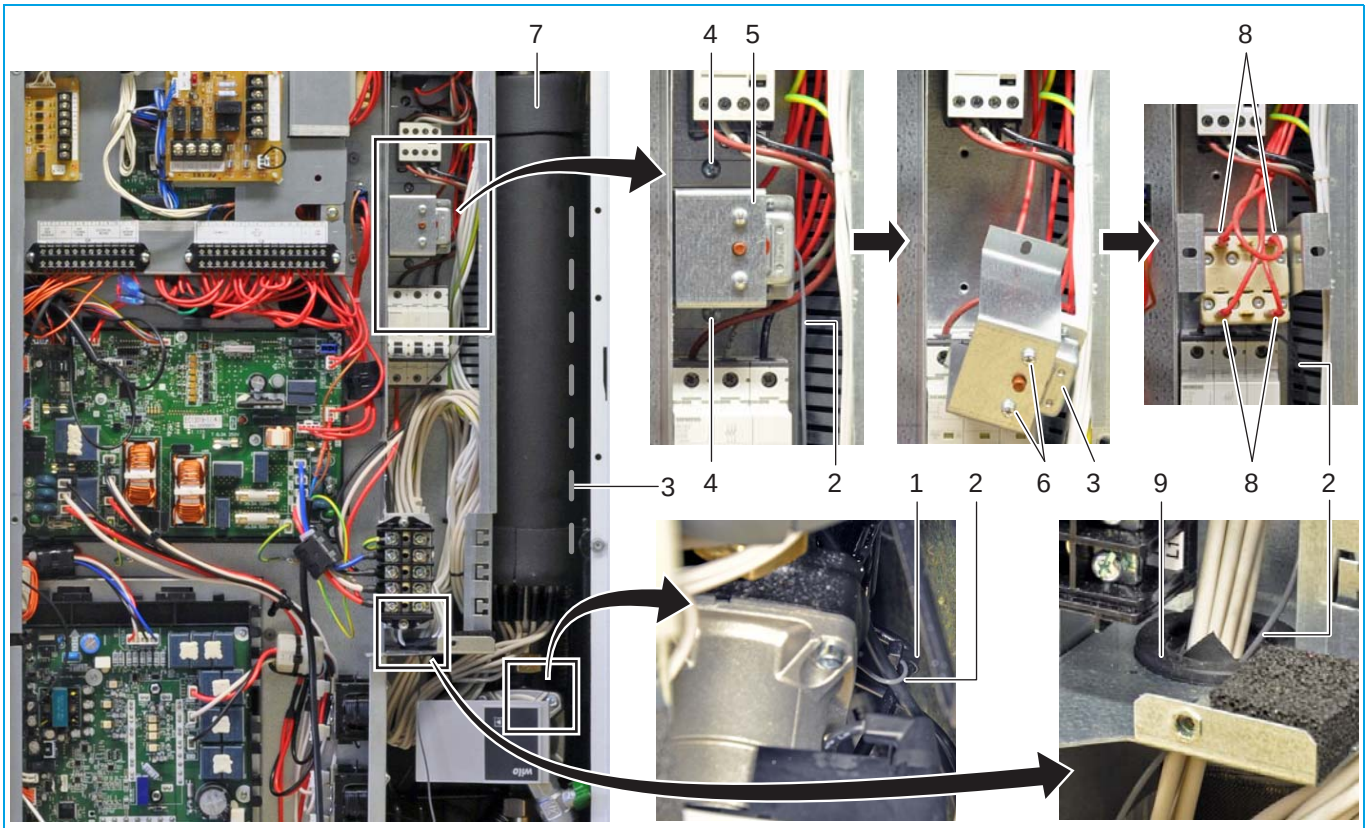
1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.

2.2.9.2 Procedure

Removal

1. Cut the tie wrap (1) that fixes the thermal protector backup heater capillary (2) to the chassis.
2. Pull the thermal protector backup heater (3) out of the backup heater (7).
3. Loosen and remove the 2 screws (4) that fix the thermal protector backup heater bracket (5).
4. Loosen and remove the 2 screws (6) that fix the thermal protector backup heater (3).
5. Remove the wiring from the wire terminals (8) of the thermal protector backup heater (3).
6. Remove the thermal protector backup heater (3) while guiding the capillary (2) through the grommet (9) at the bottom of the pivoting power input section.

Figure 27 - Replacing the thermal protector backup heater



1. Tie wrap
2. Thermal protector backup heater capillary
3. Thermal protector backup heater
4. Screw
5. Thermal protector backup heater bracket
6. Screw
7. Backup heater
8. Wire terminal
9. Grommet

Installation

1. Proceed in reverse order.

2.2.10. Replacing the water pressure relief valve

2.2.10.1 Preliminary actions

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
4. Unlock the power input section, refer to "Unlocking the pivoting power input section" on page 88.
5. Drain the water circuit, refer to "Draining the water circuit" on page 85.

2.2.10.2 Procedure

INFORMATION

Note the position of the backup heater, water pump, water pressure relief valve and the corrugated pipe. After installation of the backup heater, it must be possible to remove the thermal protector backup heater without removing the backup heater.

Removal

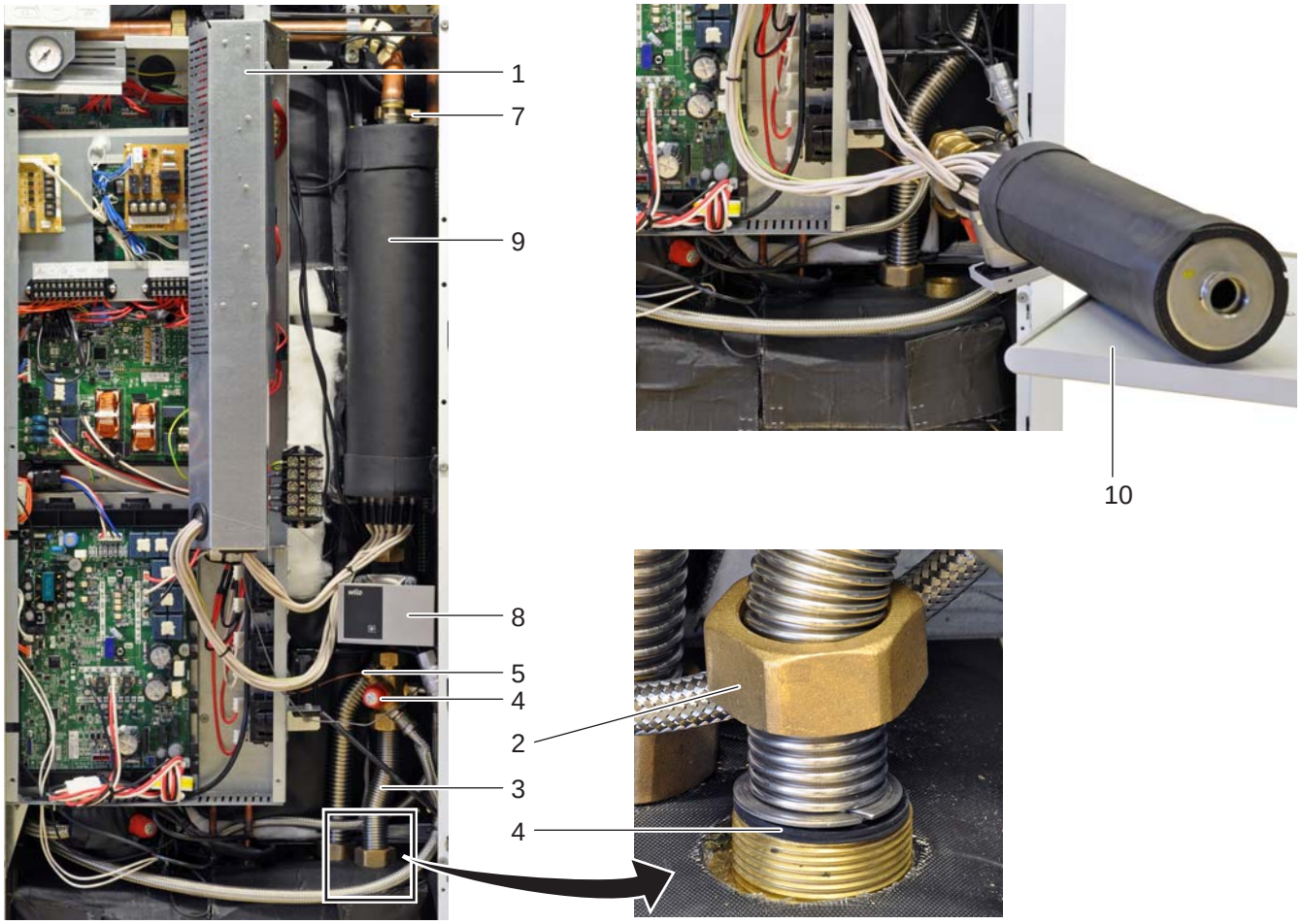
1. Turn the pivoting power input section (3) to the left, refer to "Unlocking the pivoting power input section" on page 88.
2. Loosen the lower nut (1) from the corrugated pipe (2).
3. Remove the seal (3) from the corrugated pipe (2).
4. Loosen the nut (4) that fixes the water manometer capillary to the water pressure relief valve (5).
5. Remove the seal (5) from the water manometer connection.
6. Remove the clip (6) that fixes the backup heater (8) to the domestic hot water circuit.

CAUTION

The backup heater is still connected to the Daikin Altherma GSHP.

7. Remove the backup heater (8), water pump (7), water pressure relief valve (5) and the corrugated pipe (2) from the Daikin Altherma GSHP and lay the assembly on a support (9).

Figure 28 - Replacing the water pressure relief valve - 1



1. Lower nut
2. Corrugated pipe
3. Seal
4. Nut
5. Water pressure relief valve
6. Clip
7. Water pump
8. Backup heater
9. Support

8. Remove the thermal protector backup heater (1) from the backup heater (2).
9. Loosen the nut (4) that fixes the water pressure relief valve (8) to the water pump (3).
10. Put the backup heater (2) with water pump (2) aside.
11. Loosen the nut (4) that fixes the water pressure relief valve (2) to the corrugated pipe (10).
12. Remove the seal (5) from the nut (6).
13. Loosen the nut (7) that fixes the water expansion vessel hose (12) to the water pressure relief valve (9).

CAUTION

Do not twist the water drain hose (12). The water drain (12) is glued to the water pressure relief valve (9).

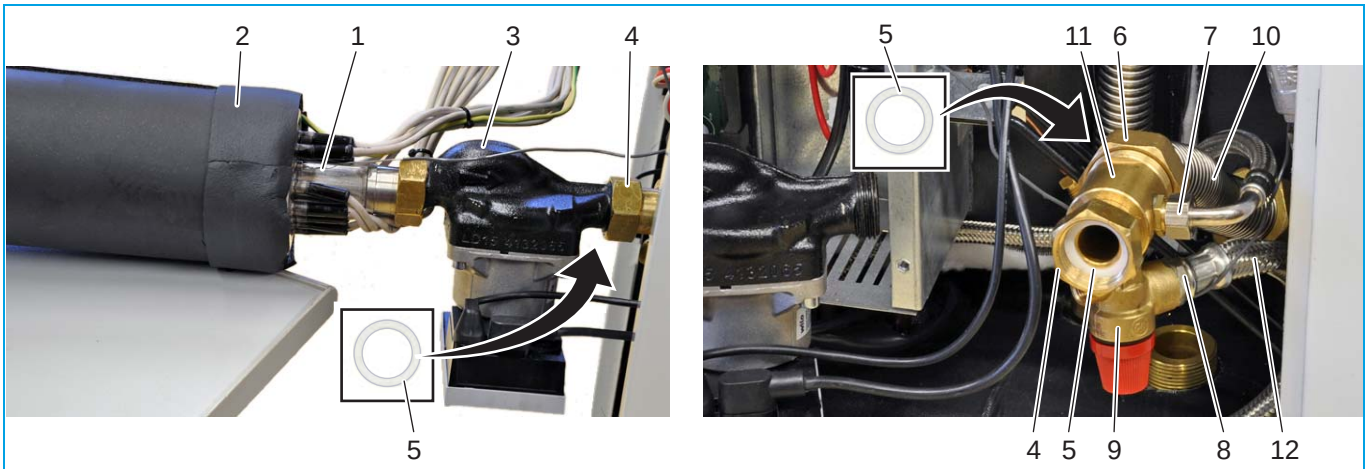
14. Screw the water pressure relief valve (9) with coupling (11) from the water drain (12).

CAUTION

The water pressure relief valve (9) is glued to the coupling (11).

15. Remove the water pressure relief valve (9) with coupling (11).

Figure 29 - Replacing the water pressure relief valve - 2

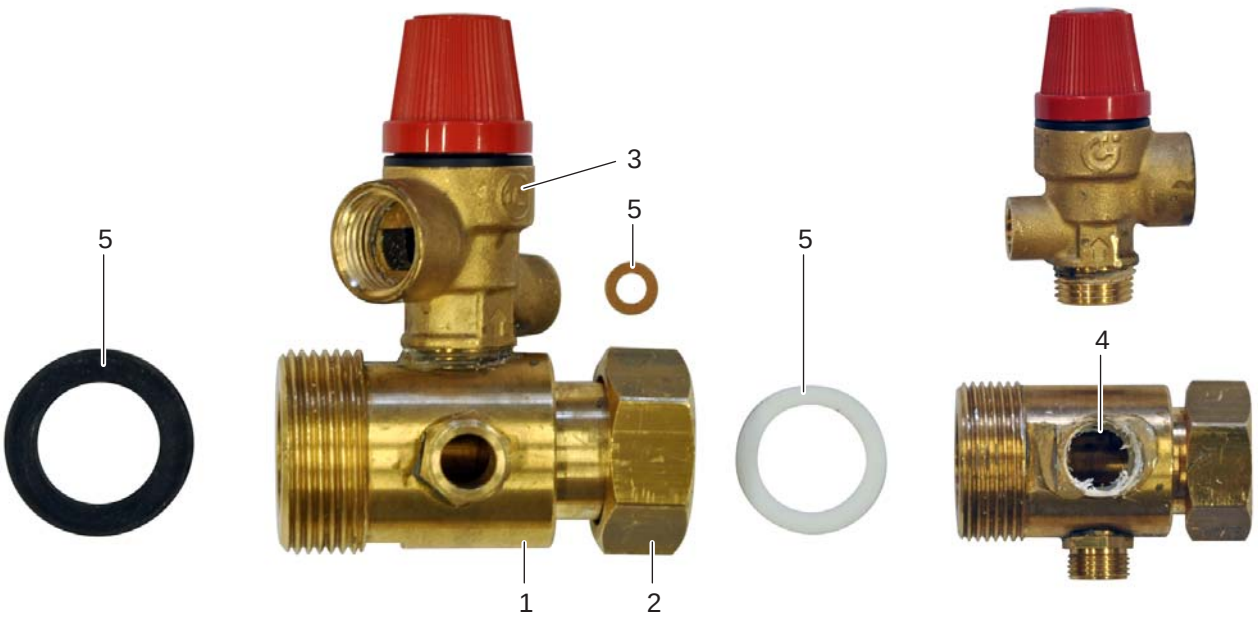


1. Thermal protector backup heater
2. Backup heater
3. Water pump
4. Nut
5. Seal
6. Nut (corrugated pipe)
7. Nut (water expansion vessel)
8. Water pressure relief valve corrugated pipe
9. Water pressure relief valve
10. Corrugated pipe
11. Coupling
12. Water drain

16. Unscrew the water pressure relief valve (3) from the coupling (1).

17. Remove the glue remainder (4) from the threads of the coupling with a scraper and a brush.

Figure 30 - Replacing the water pressure relief valve - 3



1. Coupling
2. Nut
3. Water pressure relief valve
4. Glue remainder
5. Seals

Installation

> **CAUTION**
> If damaged, replace the seals (5).

> **INFORMATION**
> When gluing the water pressure relief valve (3) to the coupling (1), make sure it is in the same angle (45°) as shown above.

1. Proceed in reverse order.
2. Fill the water circuit, refer to “To fill the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.
3. Purge the water circuit, refer to “9.3 Air purge function on the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.2.11. Replacing the brine pressure relief valve

2.2.11.1 Preliminary actions

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Drain the brine circuit, refer to "Draining the brine circuit" on page 84.

2.2.11.2 Procedure

Removal

> **INFORMATION**
> Note the position of the brine pressure relief valve. It is important that the brine pressure relief valve is mounted in the same position to ensure access to the brine pressure relief valve knob.

1. Carefully remove the insulation (1) from the brine pressure relief valve (2), the insulation will be re-used during installation.
2. Loosen the upper nut (3) that fixes the brine pressure relief valve (2).
3. Loosen the lower nut (4) that fixes the brine pressure relief valve (3).
4. Remove the seals (9) from the upper and lower nuts (3, 4).
5. Loosen the nut (7) that fixes the brine expansion vessel hose (10) to the brine pressure relief valve (2).

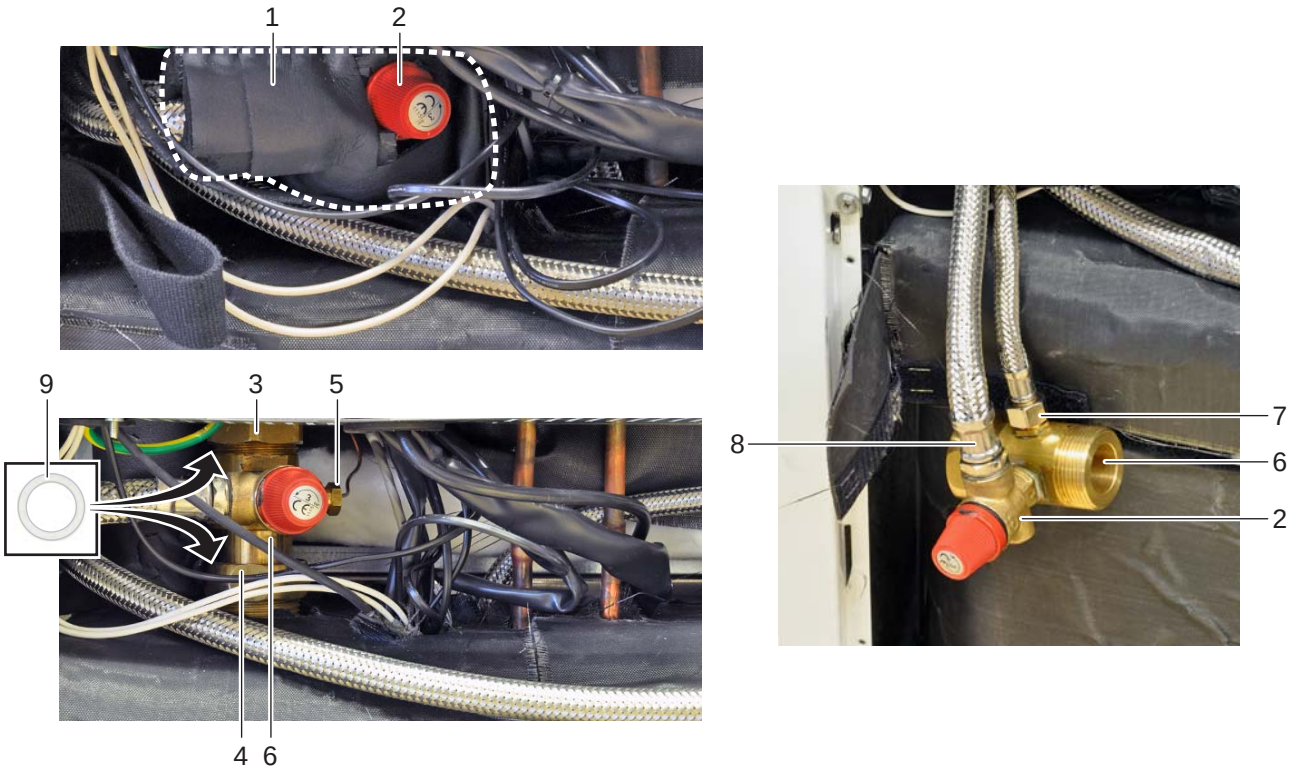
> **CAUTION**
> Do not twist the brine drain (11). The brine drain (11) is glued to the brine pressure relief valve (2).

6. Screw the brine pressure relief valve (2) with coupling (6) from the brine drain (11).

> **CAUTION**
> The brine pressure relief valve (2) is glued to the coupling (6).

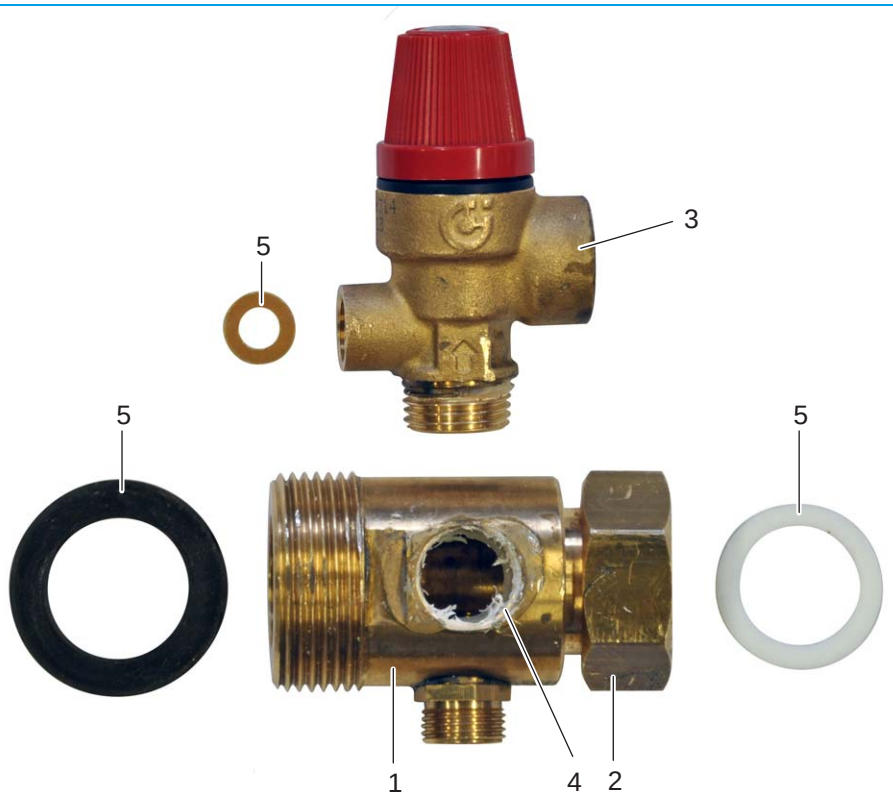
7. Remove the brine pressure relief valve (2) with coupling (6).

Figure 31 - Replacing the brine pressure relief valve - 1



1. Insulation
2. Brine pressure relief valve
3. Upper nut
4. Lower nut
5. Nut
6. Coupling
7. Nut (brine expansion vessel)
8. Nut (drain hose)
9. Seal
10. Brine expansion vessel hose
11. Brine drain

Figure 32 - Replacing the brine pressure relief valve - 1



1. Coupling
2. Nut
3. Pressure relief valve
4. Glue remainder
5. Seals

Installation

> **CAUTION**
> If damaged, replace the seals (5).

> **INFORMATION**
> When gluing the water pressure relief valve (3) to the coupling (1), make sure it is in the same angle as in figure 31 on page 112.

1. Proceed in reverse order.
2. Fill the brine circuit, refer to “To fill the brine circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.2.12. Replacing the water pump

2.2.12.1 Preliminary actions

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
4. Unlock the power input section, refer to "Unlocking the pivoting power input section" on page 88.
5. Drain the water circuit, refer to "Draining the water circuit" on page 85.

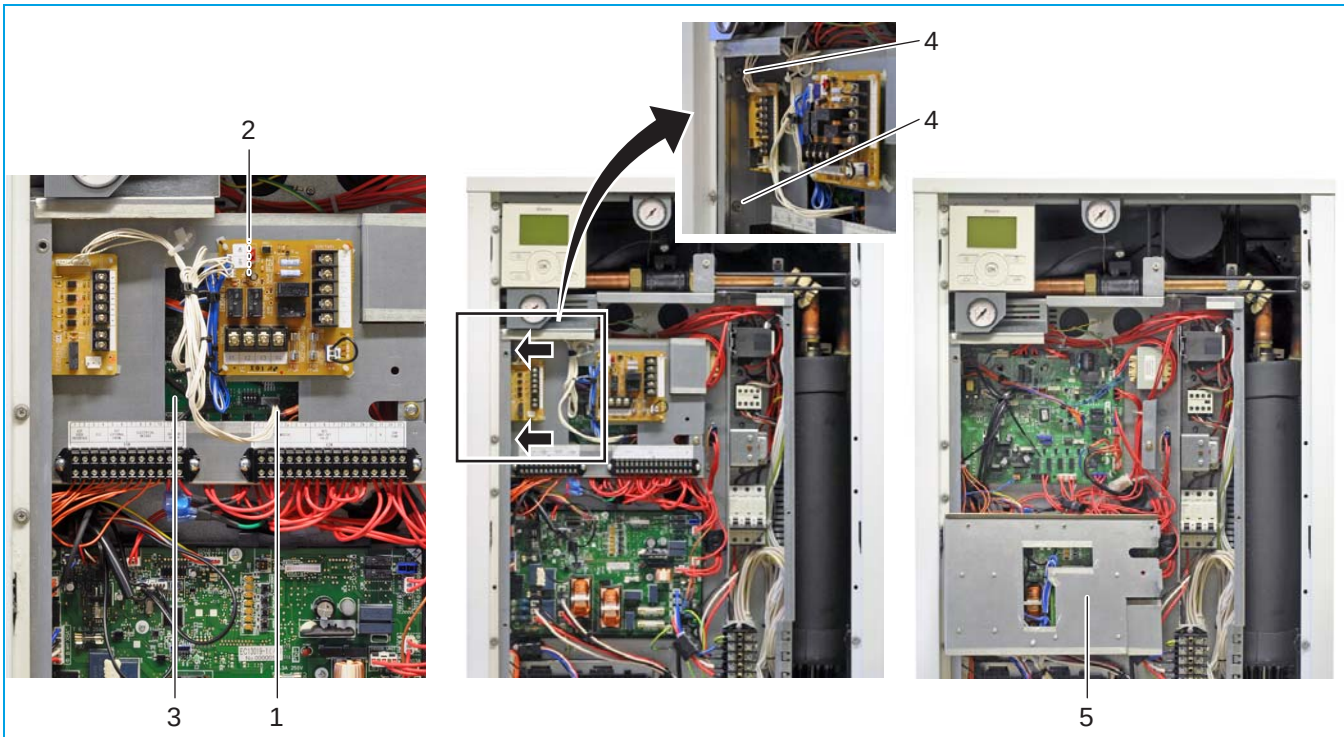
2.2.12.2 Procedure

> **INFORMATION**
>
> Note the position of the backup heater, water pump, pressure relief valve and the corrugated pipe. After installation of the backup heater, it must be possible to remove the thermal protector backup heater without removing the backup heater.

Removal

1. Unplug connectors X33A (1) and X85A (2) from the A1P PCB (3).
2. Loosen and remove the 2 screws (4) that fix the fixation plate (5).
3. Detach the right side of the fixation plate (5).
4. Flip the fixation plate (5).

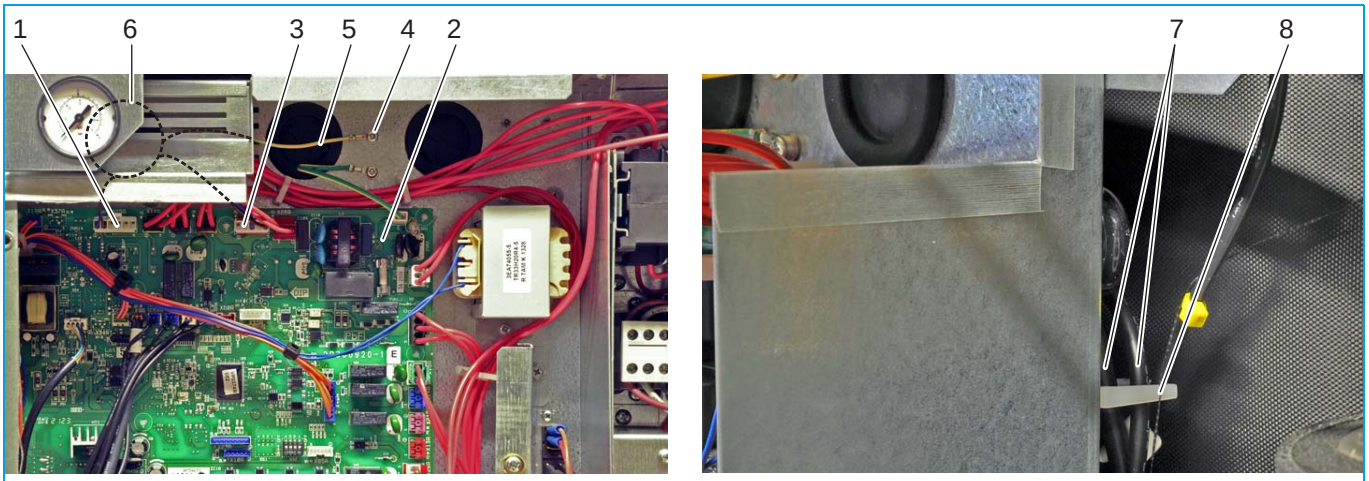
Figure 33 - Replacing the water pump - 1



1. X33A
2. X85A
3. A1 PCB
4. Screw
5. Fixation plate

5. Unplug connector X25A (1) from the A1P PCB (2).
6. Unplug connector X16A (3) from the A1P PCB (2).
7. Loosen and remove the screw (4) that fixes the water pump ground wire (5) to the chassis.
8. Guide the connectors through the grommet (6).
9. Release the water pump wires (7) from the cable guide (8).
10. Remove the water pump wires (7) from behind the switch box.

Figure 34 - Replacing the water pump - 2



1. X25A	5. Water pump ground wire
2. A1P PCB	6. Grommet
3. X16A	7. Water pump wire
4. Screw	8. Cable guide

11. Turn the pivoting power input section (3) to the left, refer to "Unlocking the pivoting power input section" on page 88.

12. Loosen the lower nut (2) from the corrugated pipe (3).

13. Remove the seal (4) from the corrugated pipe (3).

14. Loosen the nut (5) that fixes the water manometer capillary to the water pressure relief valve (6).

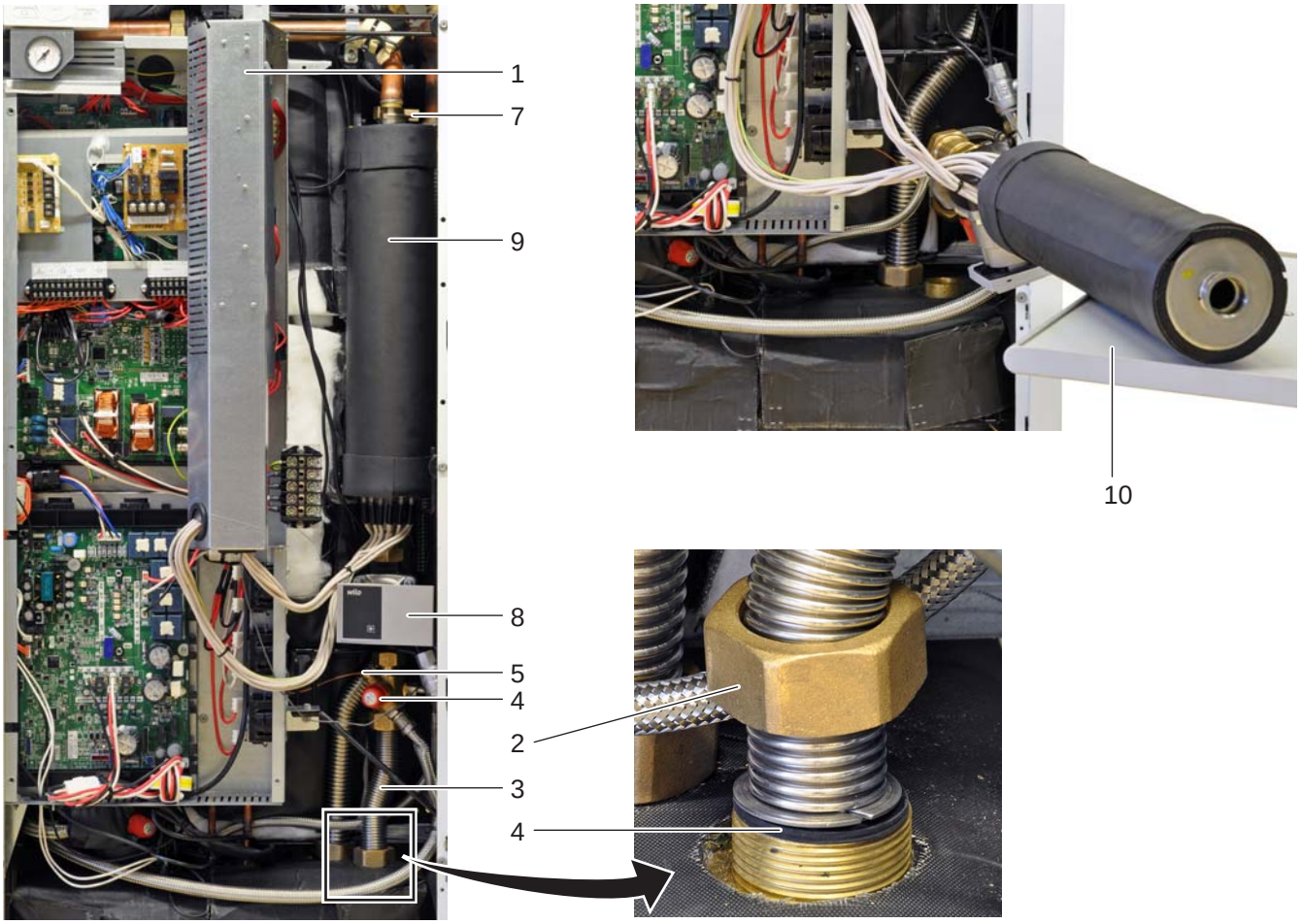
15. Remove the clip (7) that fixes the backup heater (9) to the domestic hot water circuit.

CAUTION

The backup heater (9) is still connected to the Daikin Altherma GSHP.

16. Remove the backup heater (9), water pump (8), water pressure relief valve (6) and the corrugated pipe (3) from the Daikin Altherma GSHP and lay it on a support (10).

Figure 35 - Replacing the water pump - 3



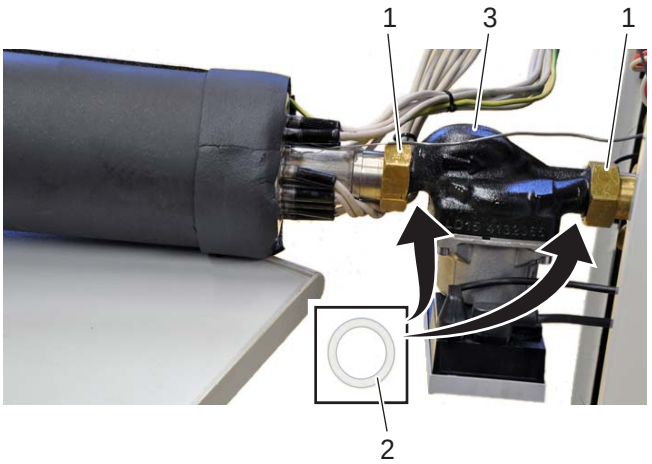
1. Pivoting power input section
2. Lower nut
3. Corrugated pipe
4. Seal
5. Nut (water manometer)
6. Water pressure relief valve
7. Clip
8. Water pump
9. Backup heater
10. Support

17. Loosen the nuts (1) that fix the water pump (3) to the pressure relief valve.

18. Remove the water pump (3).

19. Remove the seals (2) from the nuts (1).

Figure 36 - Replacing the water pump - 4



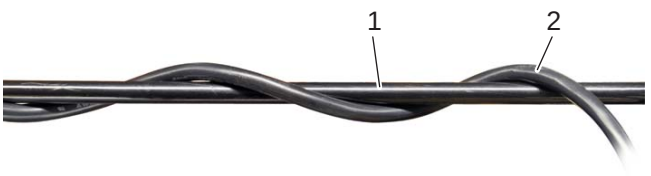
1. Nut
2. Seal
3. Water pump

Installation

CAUTION

When installing the water pump wire (2), twist the water pump wires (2) around the frame beam (1) behind the switch box to ensure strain relief.

Figure 37 - Water pump wire strain relief



1. Frame beam
2. Water pump wire

1. Proceed in reverse order.
2. Fill the water circuit, refer to “To fill the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.
3. Purge the water circuit, refer to “9.3 Air purge function on the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.2.13. Replacing the compressor

2.2.13.1 Preliminary actions

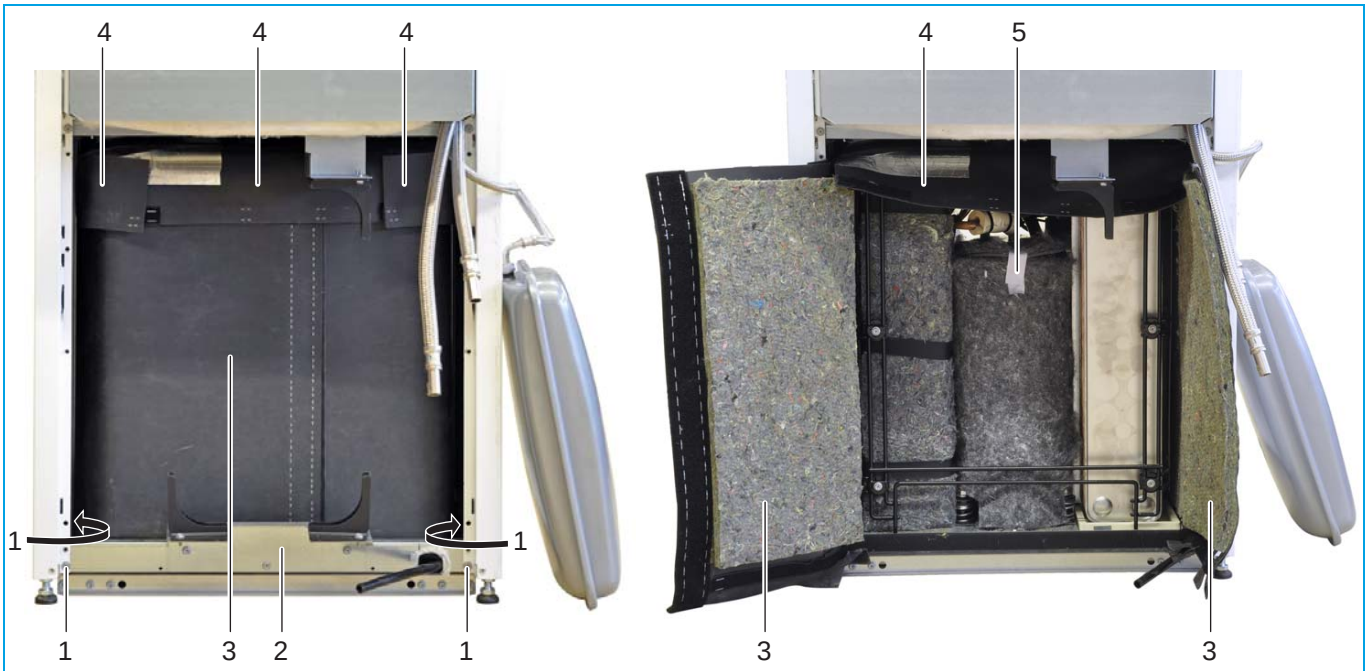
1. Switch off the Daikin Altherma GSHP via the user interface.
2. Open the front sound insulation, refer to "Opening the sound insulation of the heat pump module (front side only)" on page 87.
3. Remove the (lower) rear panel, refer to "Removing the lower rear panel" on page 90.
4. Recover the refrigerant, refer to "Refrigerant Handling" on page 84.
5. Place the water expansion vessel next to the Daikin Altherma GSHP, refer to "Replacing the water expansion vessel" on page 121.
6. Place the brine expansion vessel next to the Daikin Altherma GSHP, refer to "Replacing the brine expansion vessel" on page 122.

2.2.13.2 Procedure

Removal

1. Loosen and remove the 4 screws (1) that fix the bracket (2) on the rear side.
2. Remove the bracket (2).
3. Open the sound insulation (3) at the rear of the heat pump module by pulling the velcro strips (4).
4. From the rear side, pull the velcro strip (5) of the compressor top insulation.

Figure 38 - Replacing the compressor - 1



1. Screw
2. Bracket
3. Sound insulation
4. Velcro strip
5. Velcro strip (compressor)

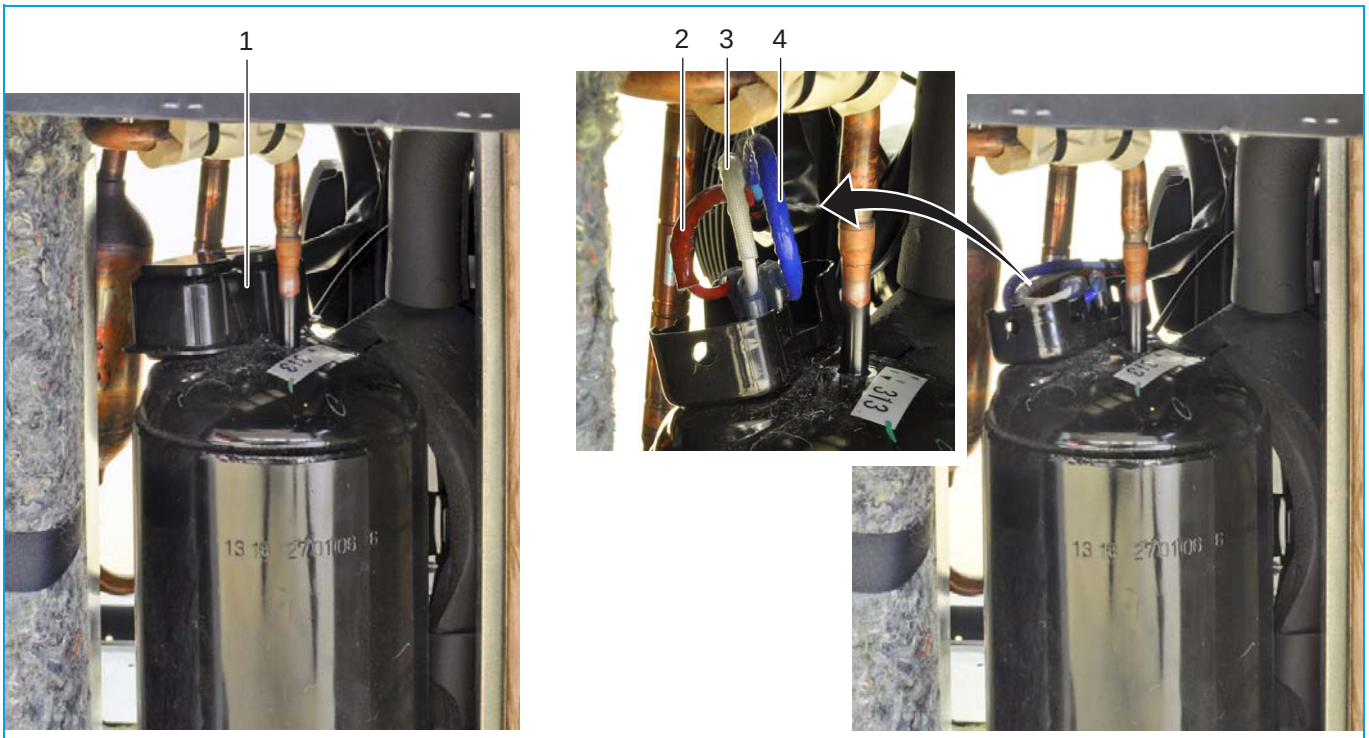
5. From the front side, release the 3 velcro strips (1) on the compressor insulation (3) and open the compressor insulation (3).

Figure 39 - Replacing the compressor - 2

1. Velcro strip
2. Compressor insulation
3. Compressor

6. From the rear side, remove the compressor insulation.
7. Remove the compressor wiring cover (1).
8. Unplug the 3 wires (2, 3, 4) from the compressor.

Figure 40 - Replacing the compressor - 3



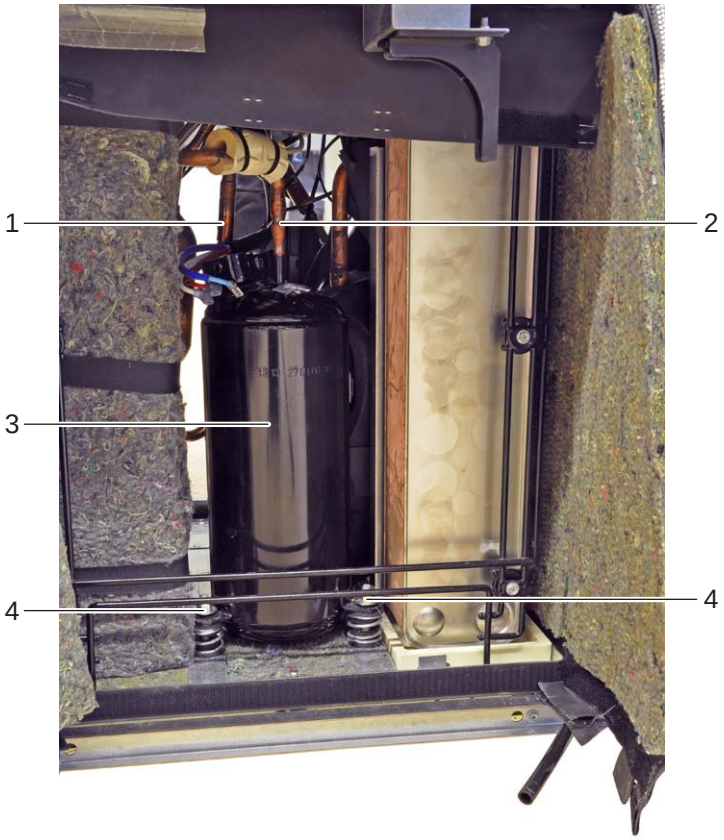
1. Compressor wiring cover
2. Red wire (U - terminal)
3. White wire (V - terminal)
4. Blue wire (W - terminal)

CAUTION

- Use welding blankets and cooling clamps to protect the components that surround the compressor.
- Cut the compressor refrigerant pipes as close to the compressor as possible to be able to re-use the existing copper piping when brazing the new compressor.

9. Cut the compressor input pipe (1) from the front of the Daikin Altherma GSHP.
10. Cut the compressor output pipe (2) from the rear of the Daikin Altherma GSHP.
11. Loosen and remove the 3 screws (4) that fix the compressor (3).
12. Remove the compressor (3).
13. Braze the remains of the compressor piping.

Figure 41 - Replacing the compressor - 4



1. Compressor input pipe
2. Compressor output pipe
3. Compressor
4. Screw

Installation

CAUTION

When brazing the compressor, use welding blankets and cooling clamps to protect the components that surround the compressor.

CAUTION

Observe the correct wiring of the compressor:

- U terminal - RED.
- V terminal - WHITE.
- W terminal - BLUE.

1. Proceed in reverse order.
2. Charge the refrigerant circuit refer to "Refrigerant Handling" on page 84.

2.2.14. Replacing the water expansion vessel

2.2.14.1 Preliminary actions

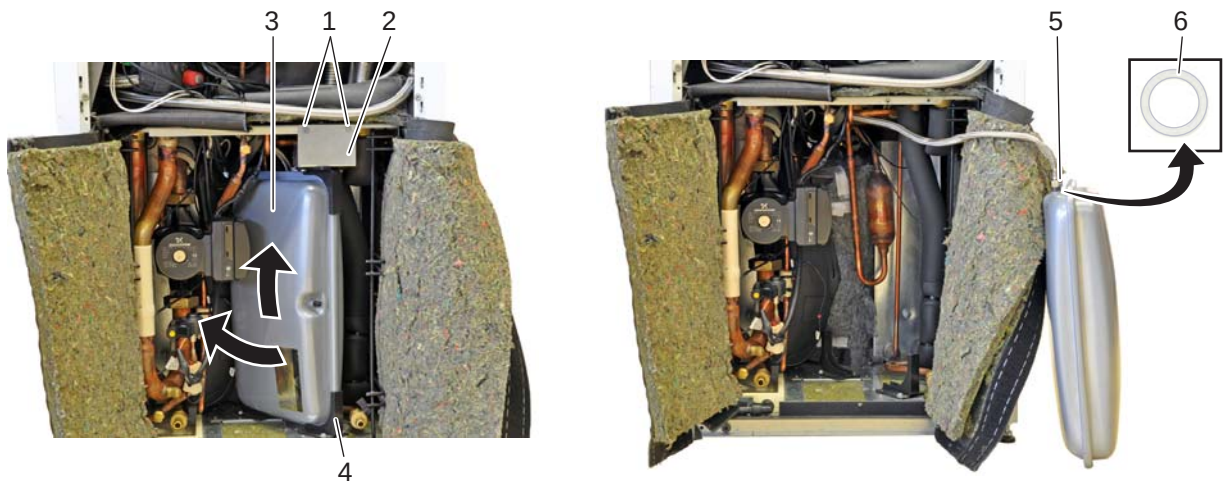
1. Switch off the Daikin Altherma GSHP via the user interface.
2. Open the sound insulation of the heat pump module (front side), refer to "Opening the sound insulation of the heat pump module (front side only)" on page 87.
3. Drain the water circuit, refer to "Draining the water circuit" on page 85.

2.2.14.2 Procedure

Removal

1. Loosen but do not remove the 2 screws (1) that fix the water expansion vessel upper support (2).
2. Lift the water expansion vessel (2) and tilt it to the left.
3. Remove the water expansion vessel (2) from the water expansion vessel lower support (4) and put it aside.
4. Loosen the nut (5) that fixes the flexible hose.
5. Remove the water expansion vessel (3).
6. Remove the seal (6) form the nut (5).

Figure 42 - Replacing the water expansion vessel



1. Screw
2. Water expansion vessel upper support
3. Water expansion vessel
4. Water expansion vessel lower support
5. Nut
6. Seal

Installation

> **CAUTION**
> If damaged, replace the seal (6).

> **CAUTION**
> If required, adjust the pressure of the water expansion vessel.

1. Proceed in reverse order.
2. Fill the water circuit, refer to “To fill the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.
3. Purge the water circuit, refer to “9.3 Air purge function on the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.2.15. Replacing the brine expansion vessel

2.2.15.1 Preliminary actions

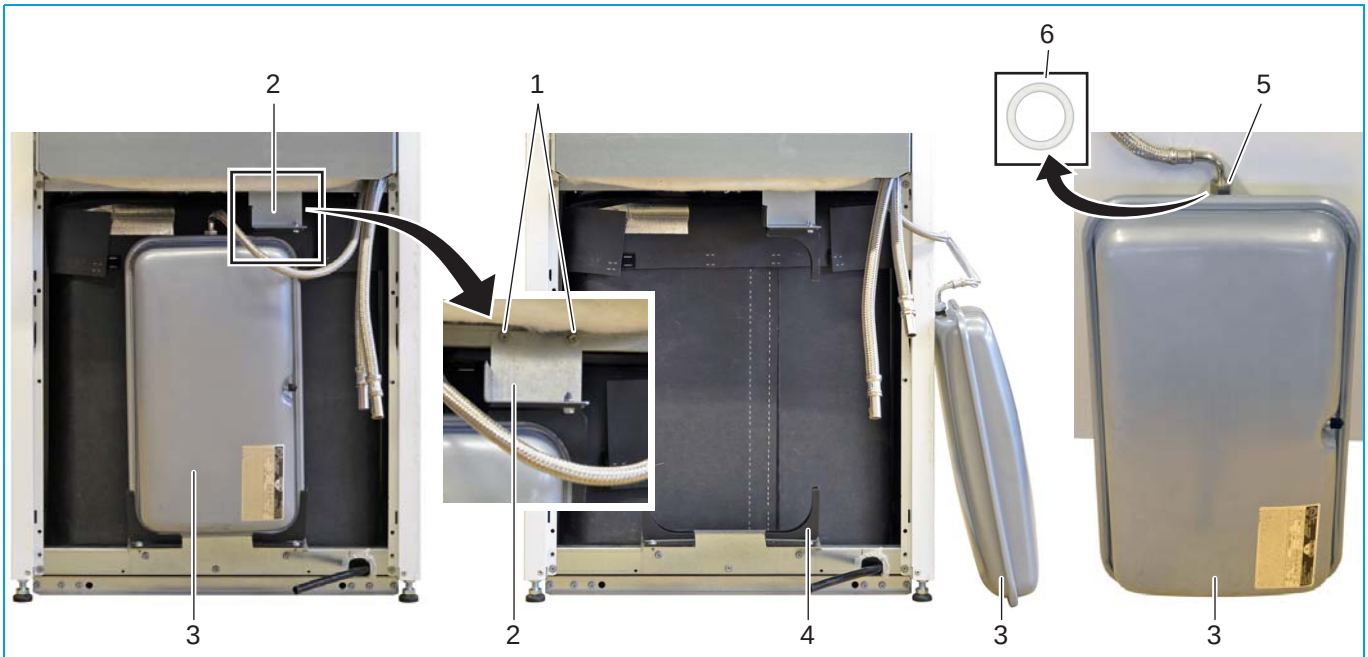
1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the lower rear panel, refer to "Removing the lower rear panel" on page 90.

2.2.15.2 Procedure

Removal

1. Loosen but do not remove the 2 screws (1) that fix the upper brine expansion vessel support (2).
2. Remove the brine expansion vessel (4) from the lower brine expansion vessel support (3) and put it aside.
3. Loosen the nut (5) that fixes the flexible hose.
4. Remove the brine expansion vessel (4).
5. Remove the seal (6) form the nut (5).

Figure 43 - Replacing the brine expansion vessel



1. Screw
2. Upper brine expansion vessel support
3. Lower brine expansion vessel support
4. Brine expansion vessel
5. Nut
6. Seal

Installation

> **CAUTION**
> If damaged, replace the seal (6).

> **CAUTION**
> If required, adjust the pressure of the brine expansion vessel (4).

1. Proceed in reverse order.
2. Fill the brine circuit, refer to “To fill the brine circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.2.16. Replacing the 3-way valve motor

2.2.16.1 Preliminary actions

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Remove the top panel, refer to "Removing the top panel" on page 86.
4. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.

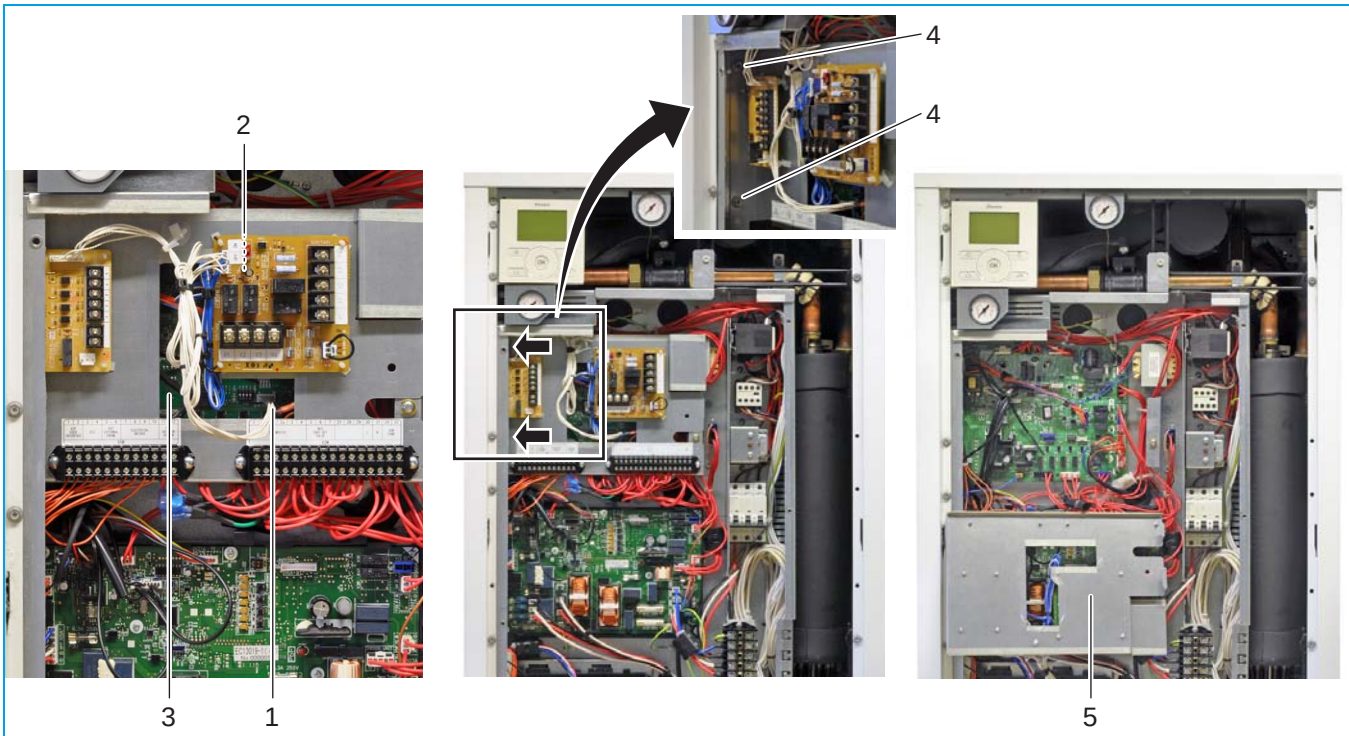
2.2.16.2 Procedure

Removal

> **INFORMATION**
> The 3-way valve wire is replaced together with the 3-way valve motor. To facilitate the installation of new 3-way valve motor, a pull line must be attached to the 3-way valve motor wire before removal.

1. Unplug connectors X33A (1) and X85A (2) from the A1P PCB (3).
2. Loosen and remove the 2 screws (4) that fix the fixation plate (5).
3. Detach the right side of the fixation plate (5).
4. Flip the fixation plate (5).

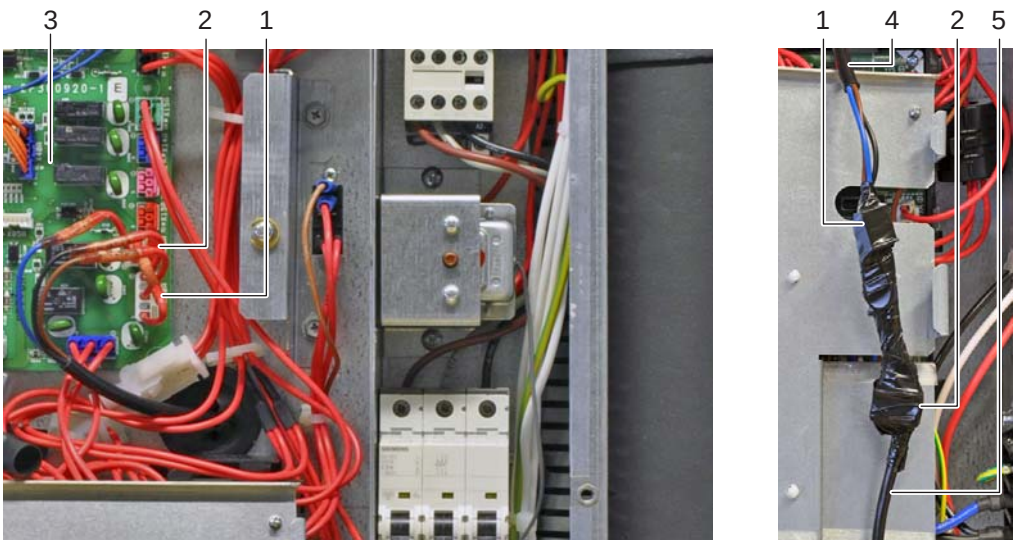
Figure 44 - Replacing the 3-way valve motor - 1



1. X33A
2. X85A
3. A1 PCB
4. Screw
5. Fixation plate

5. Unplug connectors X20A (1) and X28A (2) from the A1P PCB (3).
6. Attach a pull line (5) of approximately 2 meter to the 3-way valve motor wire (4).
7. While pulling the 3-way valve motor wire (4), guide the connectors on the 3-way valve motor wire (4) through the grommet.
8. Pull the 3-way valve motor wire (4) until the pull line (5) appears at the 3-way valve.
9. Detach the pull line (5) from the 3-way valve motor wire (4).

Figure 45 - Replacing the 3-way valve motor - 2

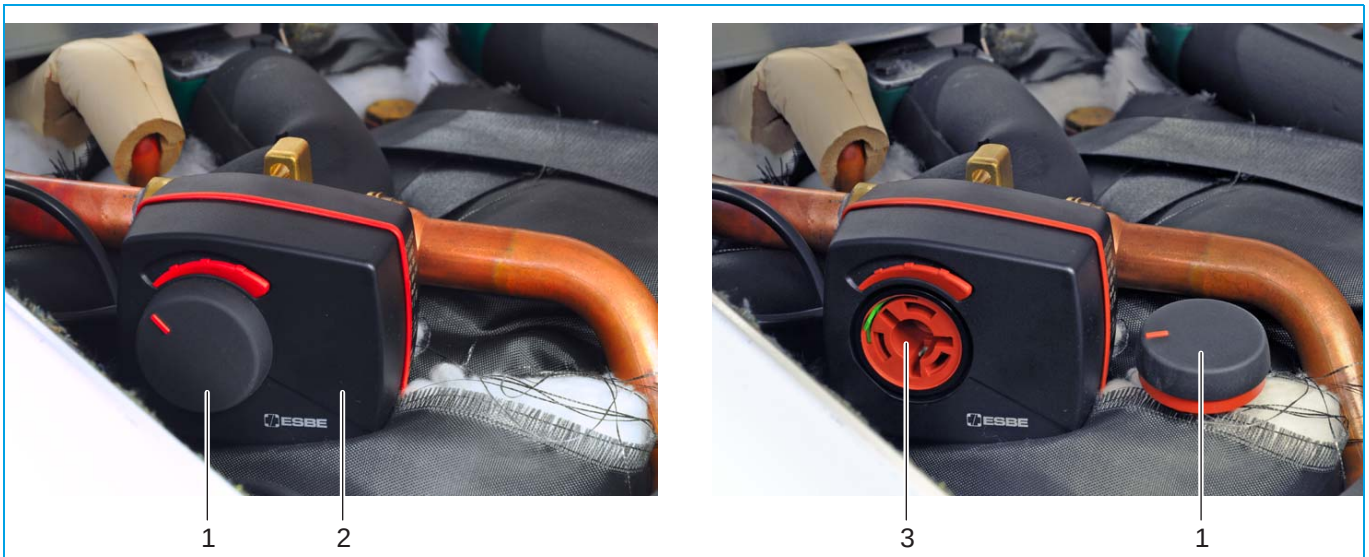


1. X20A
2. X28A
3. A1P PCB
4. 3-way valve motor wire
5. Pull line

10. Pull the 3-way valve knob (1) to remove it from the 3-way valve motor (3).

11. Loosen the screw (3).

Figure 46 - Replacing the 3-way valve motor - 3

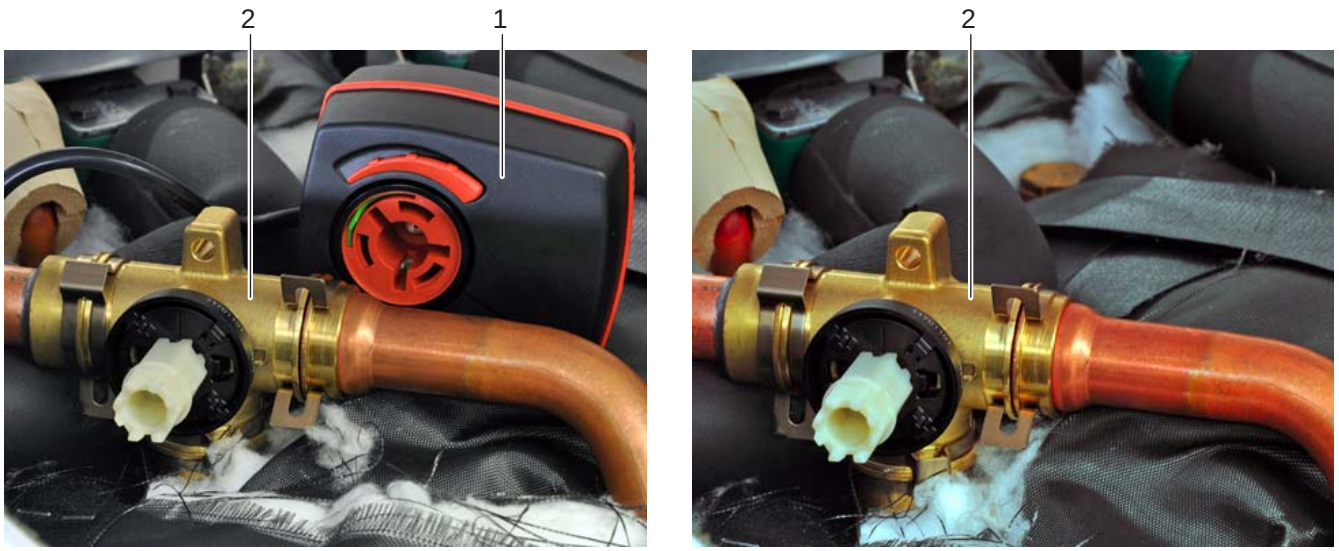


1. 3-way valve knob
2. 3-way valve motor
3. Screw

12. Remove the 3-way valve motor (1) from the 3-way valve body (2).

13. Remove the 3-way valve body (2).

Figure 47 - Replacing the 3-way valve motor - 3



1. 3-way valve motor
2. 3-way valve body

Installation

CAUTION

When mounting the 3-way valve motor on the 3-way valve body, the 3-way valve axle must be aligned with the 3-way valve motor.

The 3-way valve motor is shipped with the control knob in the centre position.

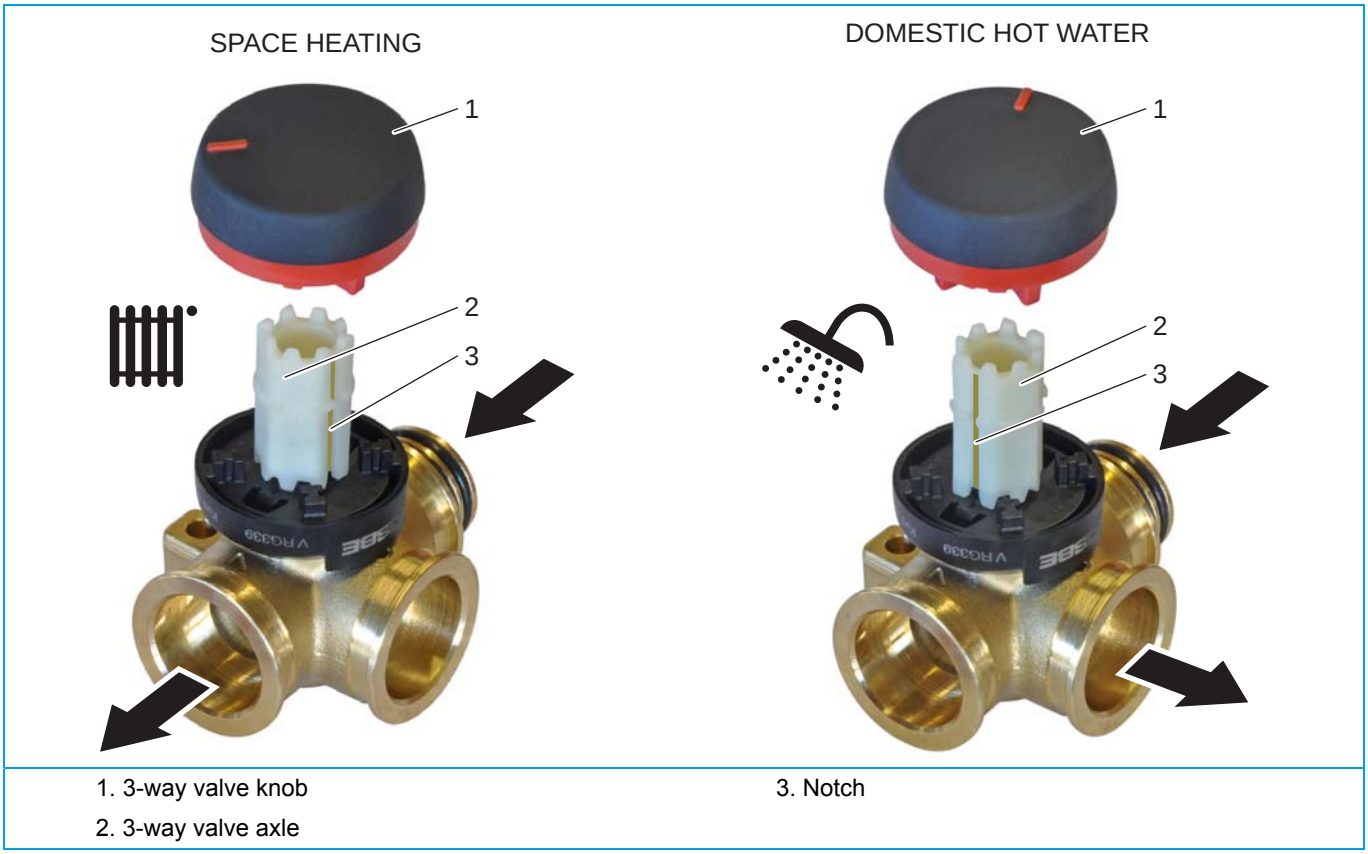
1. Check the position of the notch (3) in the 3-way valve axle (2).

2. If required, manually adjust the 3-way valve axle (2) to align the notch with the 3-way valve motor.

3. Proceed in reverse order.

4. Fill the domestic hot water circuit.

Figure 48 - Replacing the 3-way valve motor - 4



1. 3-way valve knob
2. 3-way valve axle
3. Notch

2.2.17. Replacing the 3-way valve body

2.2.17.1 Preliminary actions

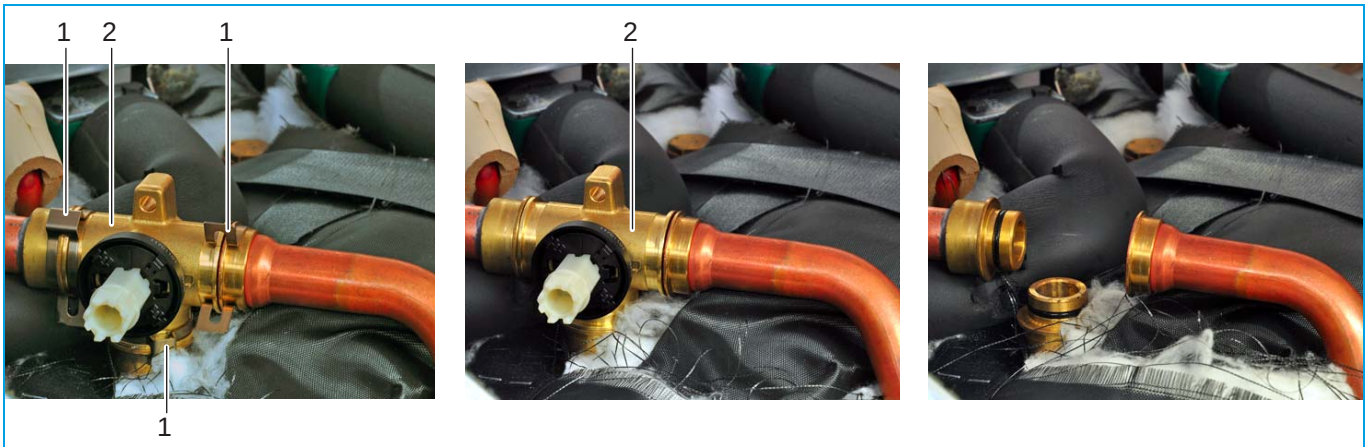
1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the front panel, refer to "Removing the front panel" on page 83.
3. Remove the top panel, refer to "Removing the top panel" on page 86.
4. Drain the water circuit, refer to "Draining the water circuit" on page 85.
5. Separate the 3-way valve motor from the 3-way valve, refer to "Replacing the 3-way valve motor" on page 123.

2.2.17.2 Procedure

Removal

1. Remove the 3 clips (2) from the 3-way valve body (1).
2. Remove the 3-way valve body (2).

Figure 49 - Replacing the 3-way valve body



1. 3-way valve body
2. Clip

Installation

> **CAUTION**
>
> When installing the 3-way valve motor on the 3-way valve, refer to Installation of "Replacing the 3-way valve motor" on page 123.

1. Proceed in reverse order.
2. Fill the water circuit, refer to “To fill the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.
3. Purge the water circuit, refer to “9.3 Air purge function on the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.2.18. Replacing the water manometer

2.2.18.1 Preliminary actions

1. Remove the front panel, refer to "Removing the front panel" on page 83.
2. Remove the top panel, refer to "Removing the top panel" on page 86.
3. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
4. Drain the water circuit, refer to "Draining the water circuit" on page 85.
5. Remove PCB A10P, refer to "Procedure: replacing the A10P PCB" on page 95.

2.2.18.2 Procedure

Removal

> **CAUTION**
>
> The capillary connection is sealed by a copper seal; when removing the water manometer capillary from the pressure relieve valve, make sure not to lose the copper seal.

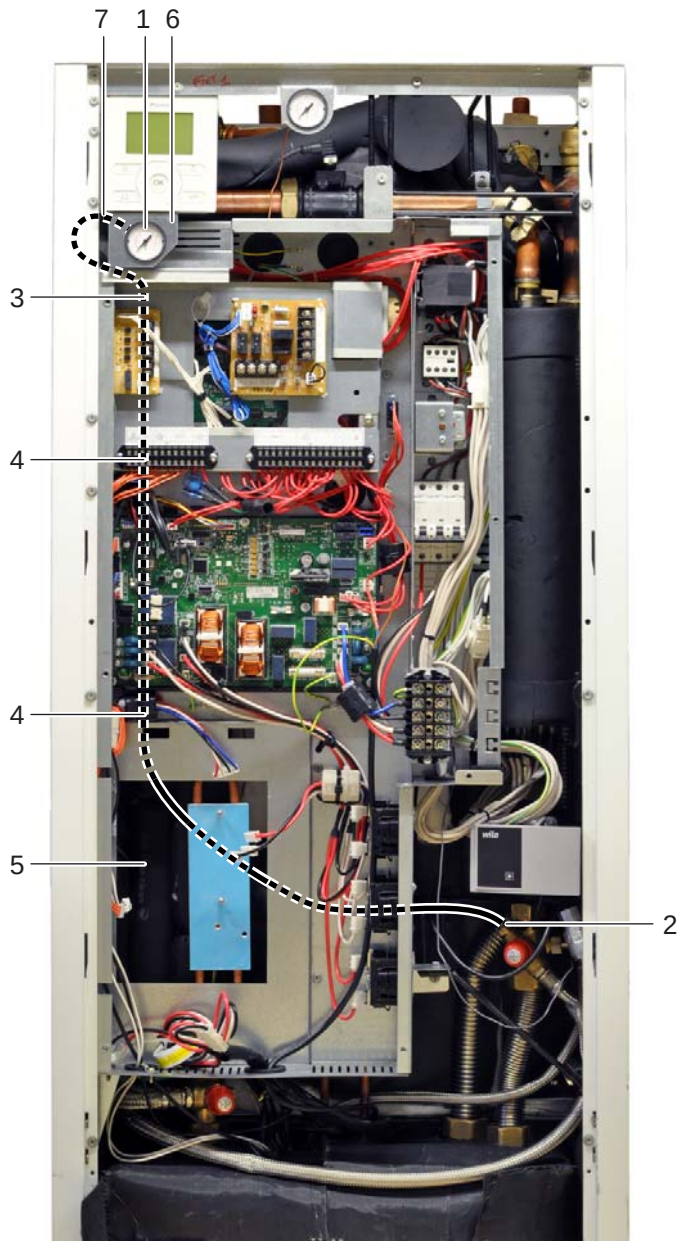
1. Loosen the nut (2) and remove the manometer capillary (3) from the water pressure relief valve.
2. Press the water manometer (1) out of the water manometer support (6).

> **CAUTION**
>
> The capillary (3) is held in position by 2 tie wraps (4). Press the insulation at the position of the tie wraps (4) to release the capillary; the same tie wraps (4) will be used when installing the new water manometer (1).

3. Through the opening in the rear of the switch box, move the manometer capillary (3) towards the top of the Daikin Altherma GSHP, while pressing the insulation where the manometer capillary (3) is attached with a tie wrap (4) to allow the nut (2) to pass.

4. Guide the manometer capillary (3) through the opening in the water manometer support (6).

Figure 50 - Replacing the water manometer - 1



1. Water manometer
2. Nut (water manometer capillary)
3. Manometer capillary
4. Tie wrap
5. Switch box opening
6. Water manometer support
7. Insulation

CAUTION

The water manometer capillary is wrapped (1) with insulation (2) at the gauge. Keep the insulation to insulate the new water manometer.

Figure 51 - Replacing the water manometer - 2

1. Water manometer	2. Insulation

Installation

> **CAUTION**
>
> The capillary of the water manometer must be wrapped with insulation behind the gauge.

1. Stick the recuperated insulation at the rear of the water manometer.
2. Proceed in reverse order.
3. Fill the water circuit, refer to “To fill the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.
4. Purge the water circuit, refer to “9.3 Air purge function on the space heating circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.2.19. Replacing the brine manometer

2.2.19.1 Preliminary actions

1. Remove the front panel, refer to "Removing the front panel" on page 83.
2. Remove the top panel, refer to "Removing the top panel" on page 86.
3. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
4. Drain the water circuit, refer to "Draining the water circuit" on page 85.
5. Remove PCB A10P, refer to "Procedure: replacing the A10P PCB" on page 95.

2.2.19.2 Procedure

Removal

> **INFORMATION**
>
> The capillary connection is sealed by a copper seal; when removing the brine manometer capillary from the pressure relieve valve, make sure not to lose the copper seal.

1. Partially remove the insulation from the brine pressure relief valve to gain access to the nut (2) that fixes the capillary.
2. Loosen the nut (2) and remove the manometer capillary (3) from the brine pressure relief valve.
3. Press the brine manometer (7) out of its support.

INFORMATION

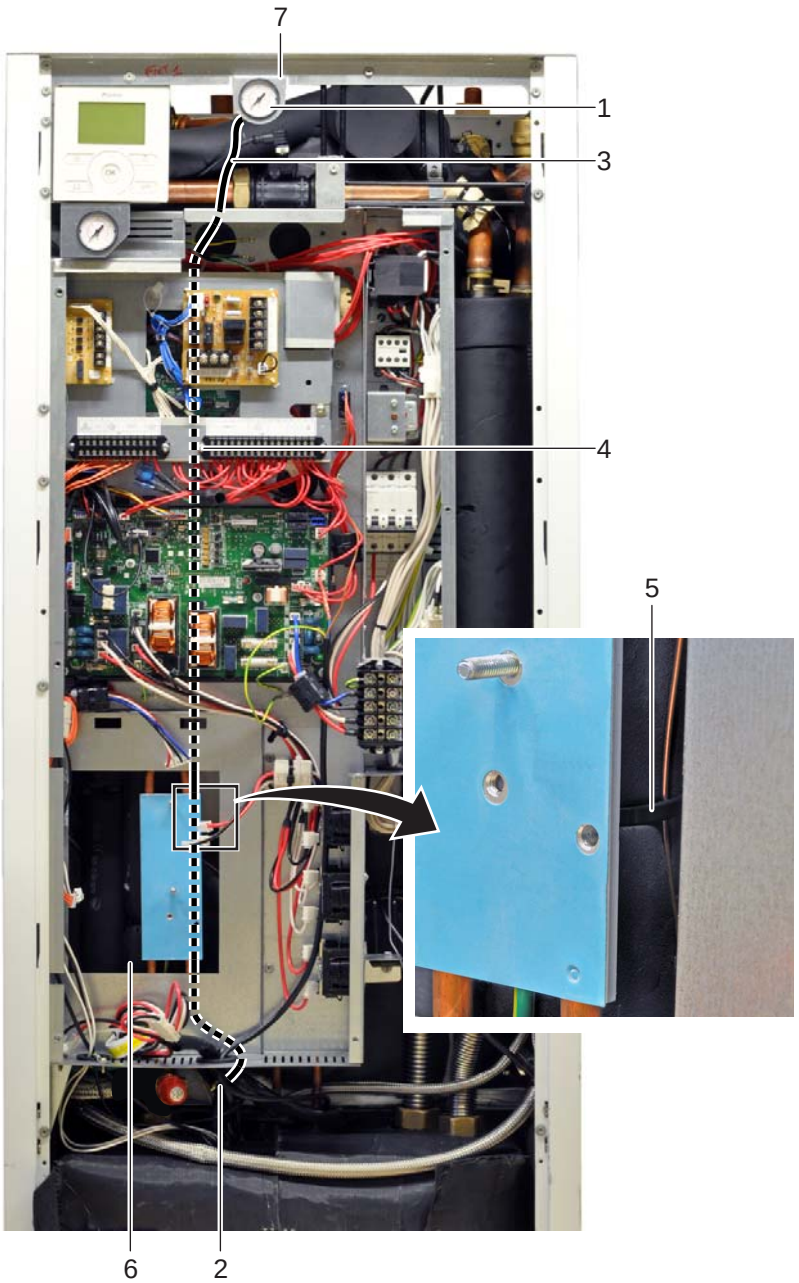
The manometer capillary (3) is held in position by 2 tie wraps (4, 5); one tie wrap (5) will be cut. Press the insulation at the position of the tie wrap (4) to release the capillary; the same tie wrap (4) will be used when installing the new water manometer.

4. Through the opening in the rear of the switch box (6), cut the tie wrap (5).

5. Through the opening in the rear of the switch box, move the manometer capillary (3) towards the top of the Daikin Altherma GSHP, while pressing the insulation where the manometer capillary (3) is attached with a tie wrap (4) to allow the capillary nut to pass.

6. Guide the manometer capillary (3) through the opening in the brine manometer support (7).

Figure 52 - Replacing the brine manometer



1. Brine manometer
2. Nut (water manometer capillary)
3. Manometer capillary
4. Tie wrap
5. Tie wrap
6. Switch box opening
7. Brine manometer support

Installation

> **INFORMATION**
>
> When installing the brine manometer, use a tie wrap to fix the capillary against the insulated pipe to ensure strain relief.

1. Proceed in reverse order.
2. Fill the brine circuit, refer to “To fill the brine circuit” in the Daikin Altherma ground source heat pump Installer reference guide.

2.2.20. Replacing the electronic expansion valve K1E body

2.2.20.1 Preliminary actions

1. Remove the front panel, refer to "Removing the front panel" on page 83.
2. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
3. Open the Sound Insulation of the heat pump module (front side only), "Opening the sound insulation of the heat pump module (front side only)" on page 87.

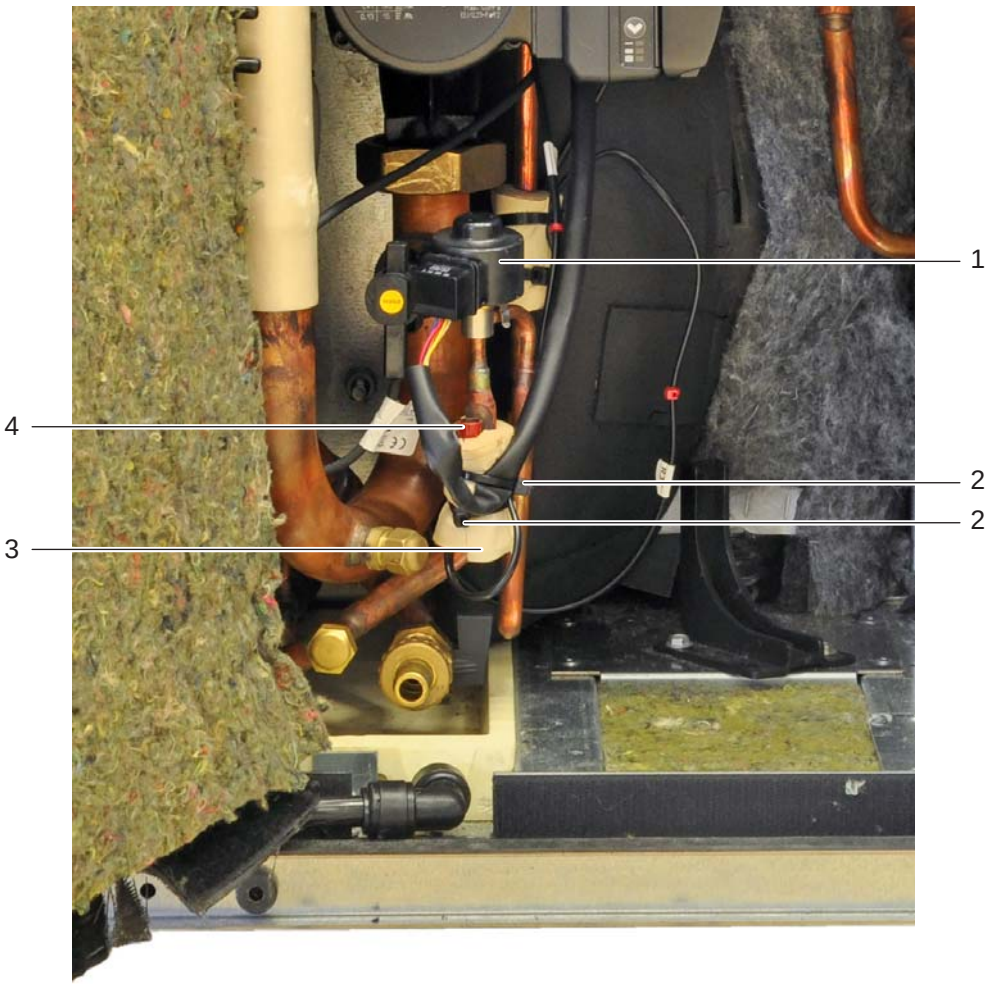
2.2.20.2 Procedure

Removal

> **CAUTION**
>
> Use welding blankets and cooling clamps to protect the components that surround the expansion valve.

1. Remove the motor (1) from the expansion valve.
2. Cut the 2 tie wraps (2).
3. Slide the insulation (3) downwards.
4. Remove temperature sensor R4T (4) from its support, refer to "Replacing a thermistor (except R10T)" on page 141.

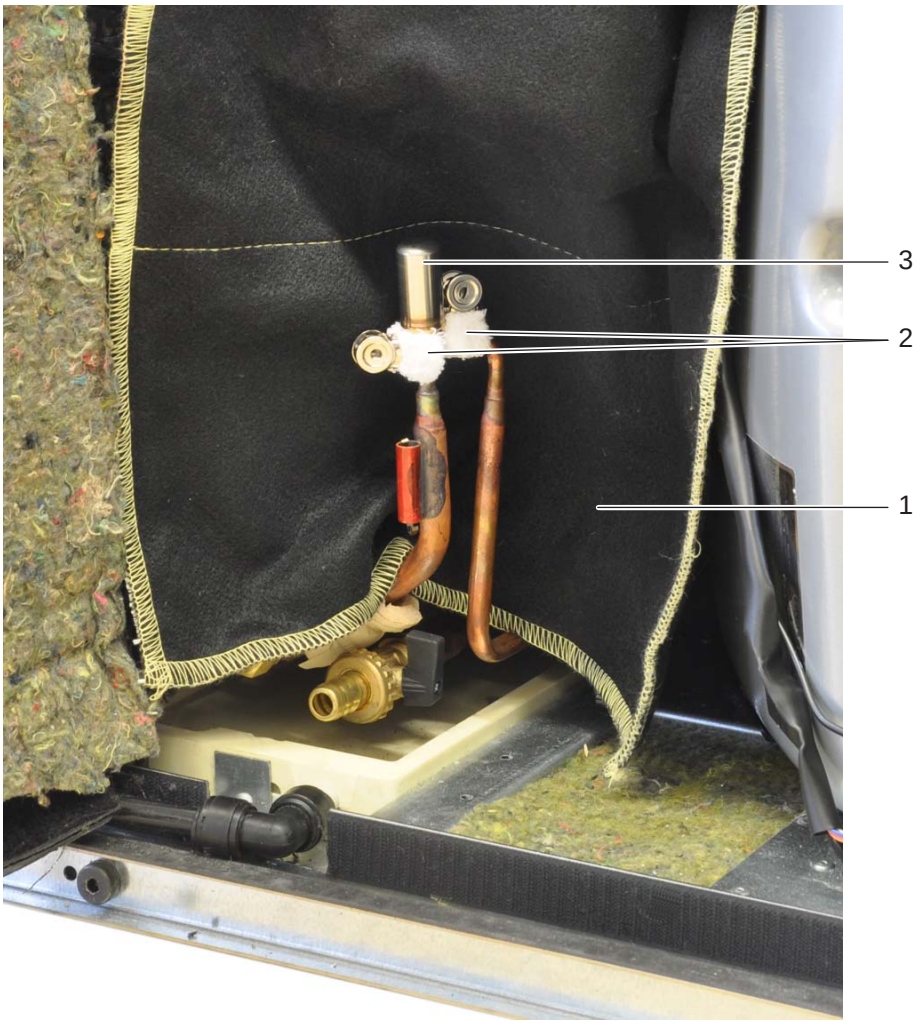
Figure 53 - Replacing the electronic expansion valve K1E body - 1



1. Expansion valve electromagnet
2. Tie wraps
3. Insulation
4. R4T

5. Use a welding blanket (1) to protect the components that surround the expansion valve body.
6. Place 2 wet cooling clamps (2) on the expansion valve body (3).
7. Braze the expansion valve body piping and remove the expansion valve.

Figure 54 - Replacing the electronic expansion valve K1E body - 2



1. Welding blanket
2. Cooling clamp
3. Expansion valve body

Installation

CAUTION

Use welding blankets to protect the components that surround the expansion valve body.

Use 2 cooling clamps to protect the expansion valve during brazing.

1. Proceed in reverse order.

2.2.21. Replacing the electronic expansion valve K1E electromagnet

2.2.21.1 Preliminary actions

1. Remove the front panel, refer to "Removing the front panel" on page 83.
2. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
3. Open the Sound Insulation of the heat pump module (front side only), "Opening the sound insulation of the heat pump module (front side only)" on page 87.

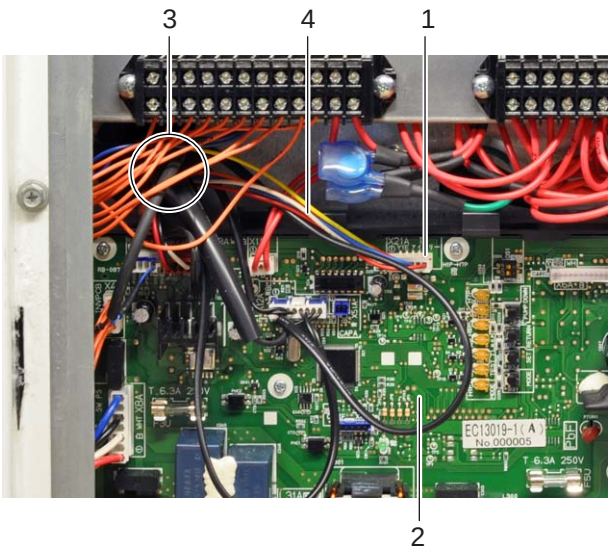
2.2.21.2 Procedure

Removal

> **INFORMATION**
>
> The electronic expansion valve electromagnet is replaced together with the electronic expansion valve electromagnet wire. To facilitate the installation of the new electronic expansion valve electromagnet, a pull line must be attached to the electronic expansion valve electromagnet wire before removal.

1. Unplug connector X21A (1) from the A9P PCB (2).
2. Attach a pull line (5) of approximately 2 meter to the electronic expansion valve wire (4).
3. Cut the tie wraps (6).
4. While guiding the pull line (5) through the grommet (3), pull the electronic expansion valve wire (4) until the pull line (5) surfaces at the heat pump module.
5. Detach the pull line (5) from the electronic expansion valve wire (4).

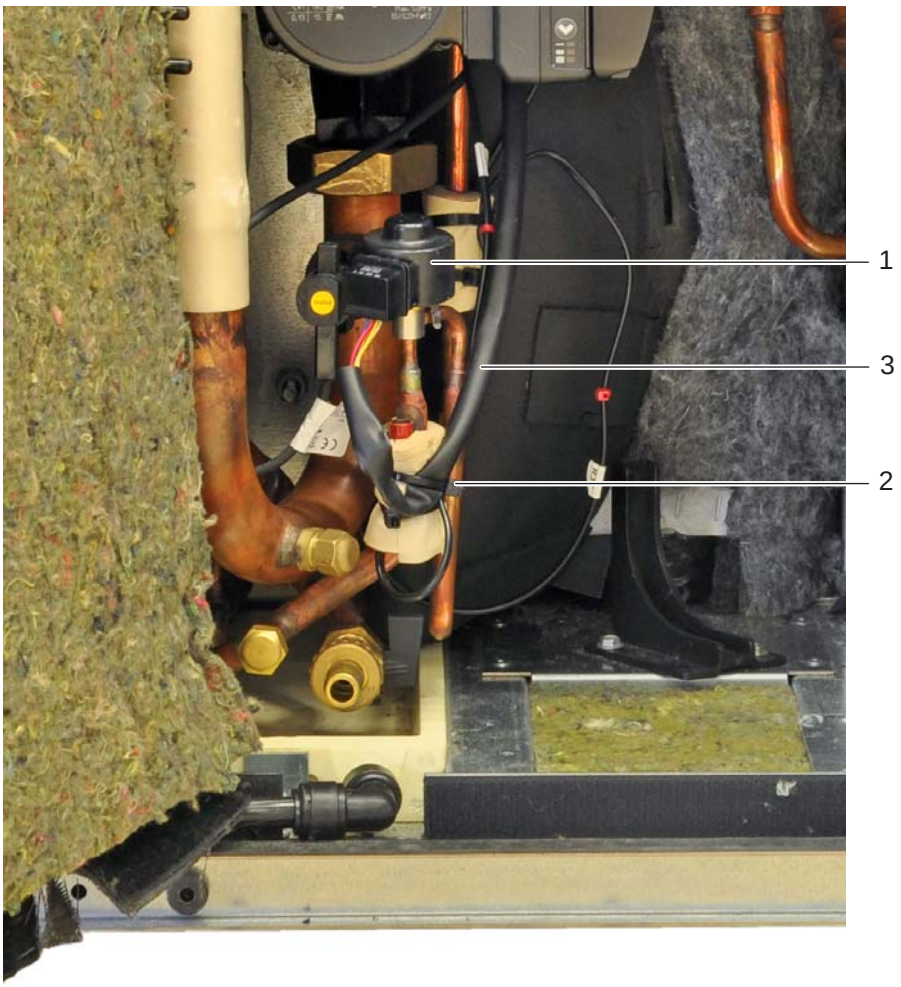
Figure 55 - Replacing the electronic expansion valve K1E electromagnet



1. X21A	4. Electronic expansion valve wire
2. A9P PCB	5. Pull line (not illustrated)
3. Grommet	6. Tie wrap (not illustrated)

6. Cut the tie wrap (2).
7. Remove the expansion valve electromagnet (1) from the electronic expansion valve.
8. Remove the expansion valve electromagnet (1).

Figure 56 - Replacing the electronic expansion valve K1E electromagnet



1. Electronic expansion valve electromagnet
2. Tie wrap
3. Electronic expansion valve wire

Installation

1. Proceed in reverse order.

2.2.22. Replacing the refrigerant high pressure sensor

2.2.22.1 Preliminary actions

1. Switch off the Daikin Altherma GSHP via the user interface.
2. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
3. Open the front sound insulation, refer to "Opening the sound insulation of the heat pump module (front side only)" on page 87.
4. Remove the (lower) rear panel, refer to "Removing the lower rear panel" on page 90.
5. Recover the refrigerant, refer to "Refrigerant Handling" on page 84.
6. Place the brine expansion vessel next to the Daikin Altherma GSHP, refer to "Replacing the brine expansion vessel" on page 122.
7. Remove the insulation from the compressor, refer to "Replacing the compressor" on page 117.

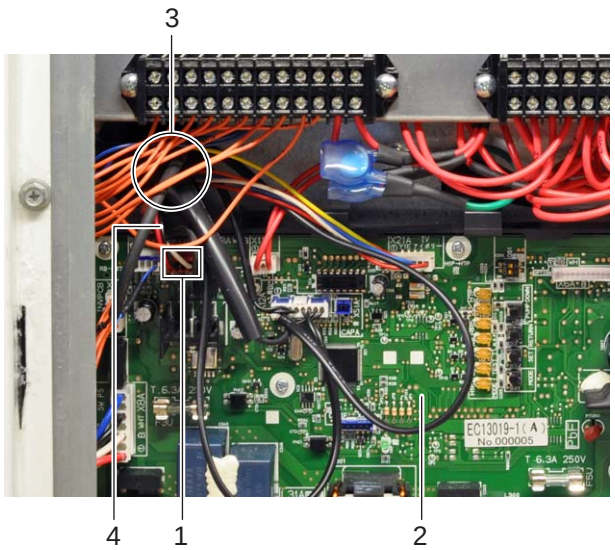
2.2.22.2 Procedure

Removal

> **INFORMATION**
>
> The refrigerant high pressure sensor wire is replaced with the refrigerant high pressure sensor. A pull line must be attached to the refrigerant high pressure sensor wire before removing the wire.

1. Unplug connector X17A (1) from the A9P PCB (2).
2. Attach a pull line (5) of approximately 2 meter to the high pressure sensor wire (4).
3. Cut the tie wraps (6).
4. While guiding the pull line (5) through the grommet (3), pull the high pressure sensor wire (4) until the pull line (5) surfaces at the heat pump module.
5. Detach the pull line (5) from the electronic expansion valve wire (4).

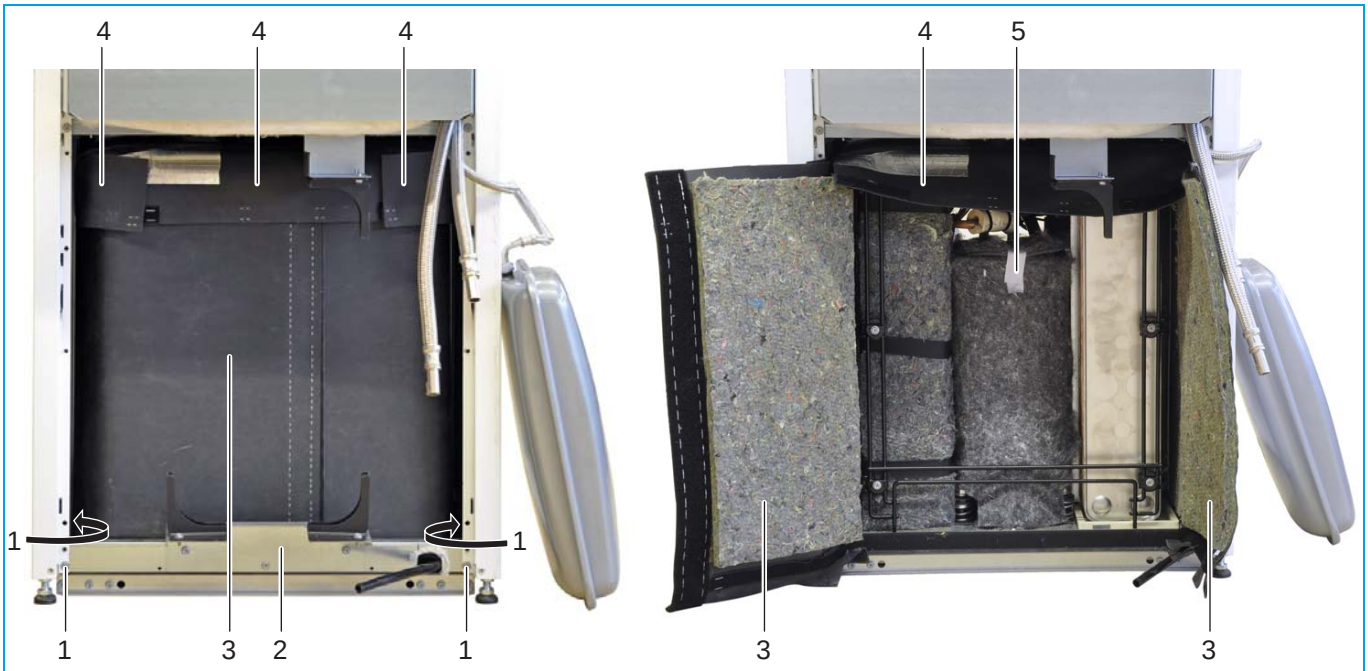
Figure 57 - Replacing the refrigerant high pressure sensor - 1



1. X17A	4. High pressure sensor wire
2. A9 PCB	5. Pull line (not illustrated)
3. Grommet	6. Tie wrap (not illustrated)

1. Loosen and remove the 4 screws (1) that fix the bracket (2) on the rear side.
2. Remove the bracket (2).
3. Open the sound insulation (3) at the rear of the heat pump module by pulling the velcro strips (4).
4. From the rear side, pull the velcro strip (5) of the compressor top insulation.

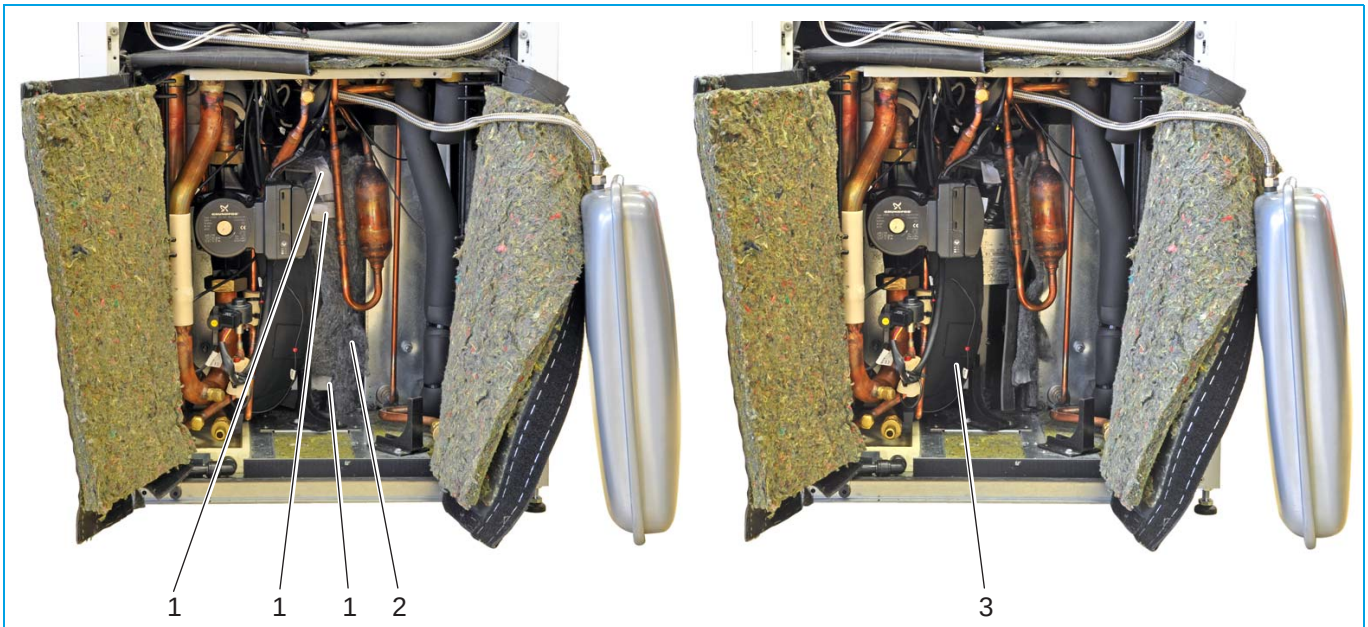
Figure 58 - Replacing the refrigerant high pressure sensor - 2



1. Screw
2. Bracket
3. Sound insulation
4. Velcro strip
5. Velcro strip (compressor)

5. From the front side, release the 3 velcro strips (1) on the compressor insulation (2) and open the compressor insulation (2).

Figure 59 - Replacing the refrigerant high pressure sensor - 3



1. Velcro strip
2. Compressor insulation
3. Compressor

6. From the rear side, remove the compressor insulation.

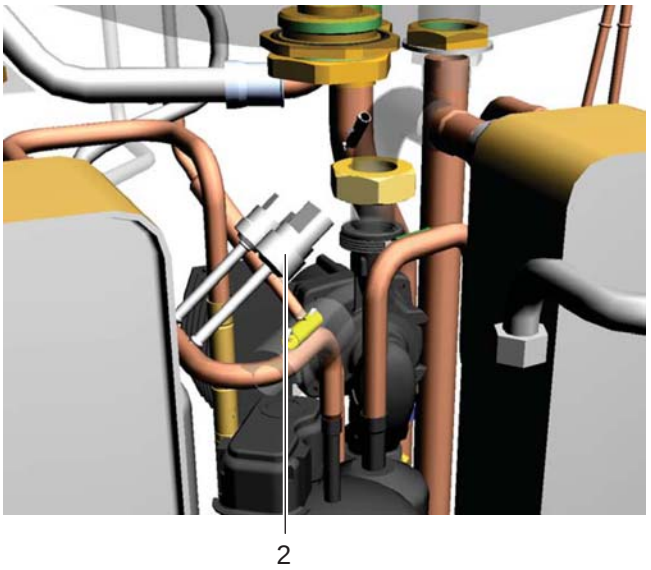
7. Use a welding blanket (1) to protect the components that surround the refrigerant high pressure sensor (2).

8. Place 2 wet cooling clamps (3) on the refrigerant high pressure sensor (2) body.

9. Braze the refrigerant high pressure sensor piping.

10. Remove the refrigerant high pressure sensor (2).

Figure 60 - Replacing the refrigerant high pressure sensor - 3



1. Welding blanket (not illustrated)
2. Refrigerant high pressure sensor
3. Cooling clamp (not illustrated)

Installation

CAUTION

Use welding blankets to protect the components that surround the refrigerant high pressure sensor.

Use 2 cooling clamps to protect the refrigerant high pressure sensor during brazing.

1. Proceed in reverse order.

2.2.23. Replacing the refrigerant high pressure switch

2.2.23.1 Preliminary actions

1. Remove the front panel, refer to "Removing the front panel" on page 83.
2. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
3. Open the Sound Insulation of the heat pump module (front side only), "Opening the sound insulation of the heat pump module (front side only)" on page 87.

2.2.23.2 Procedure

Removal

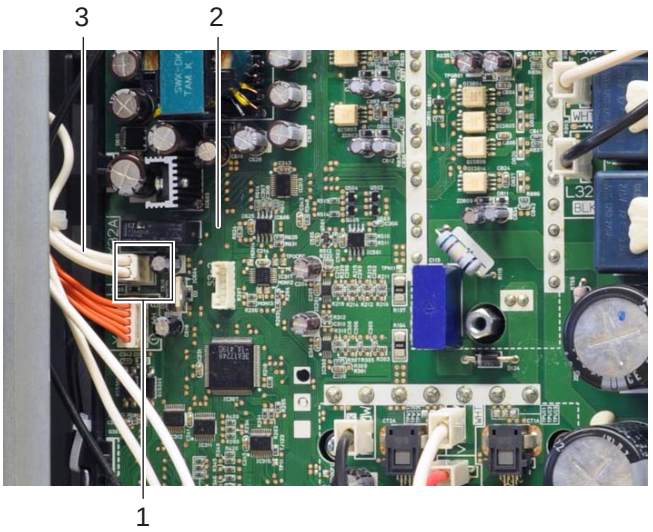
INFORMATION

The refrigerant high pressure switch wire is replaced with the refrigerant high pressure switch. A pull line must be attached to the refrigerant high pressure sensor switch before removing the wire.

1. Unplug connector X32A (1) from the A10P PCB (2).
2. Attach a pull line (4) of approximately 2 meter to the refrigerant high pressure switch wire (3).
3. Cut the tie wraps (5).
4. While guiding the pull line (4) pull the refrigerant high pressure switch wire (3) until the pull line (4) surfaces at the heat pump module.

5. Detach the pull line (4) from the refrigerant high pressure switch wire (3).

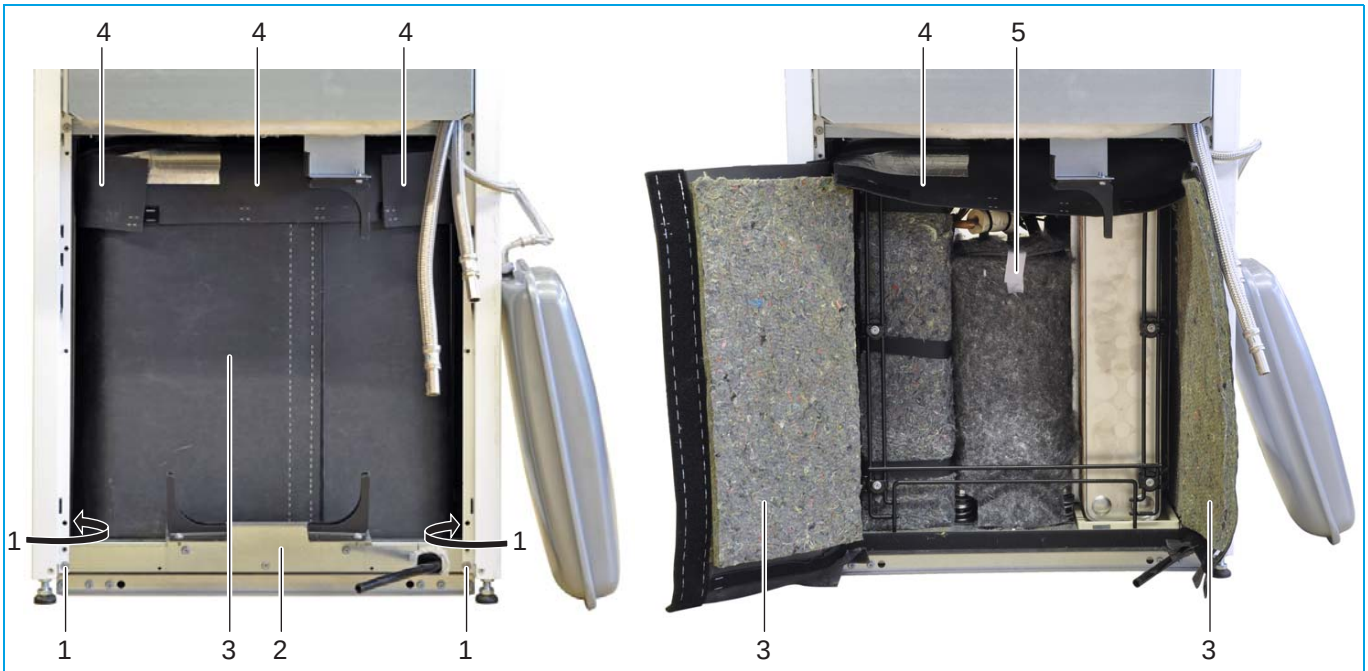
Figure 61 - Replacing the refrigerant high pressure switch - 1



1. X32A
2. A10 PCB
3. Refrigerant high pressure switch wire
4. Pull line (not illustrated)
5. Tie wraps (not illustrated)

1. Loosen and remove the 4 screws (1) that fix the bracket (2) on the rear side.
2. Remove the bracket (2).
3. Open the sound insulation (3) at the rear of the heat pump module by pulling the velcro strips (4).
4. From the rear side, pull the velcro strip (5) of the compressor top insulation.

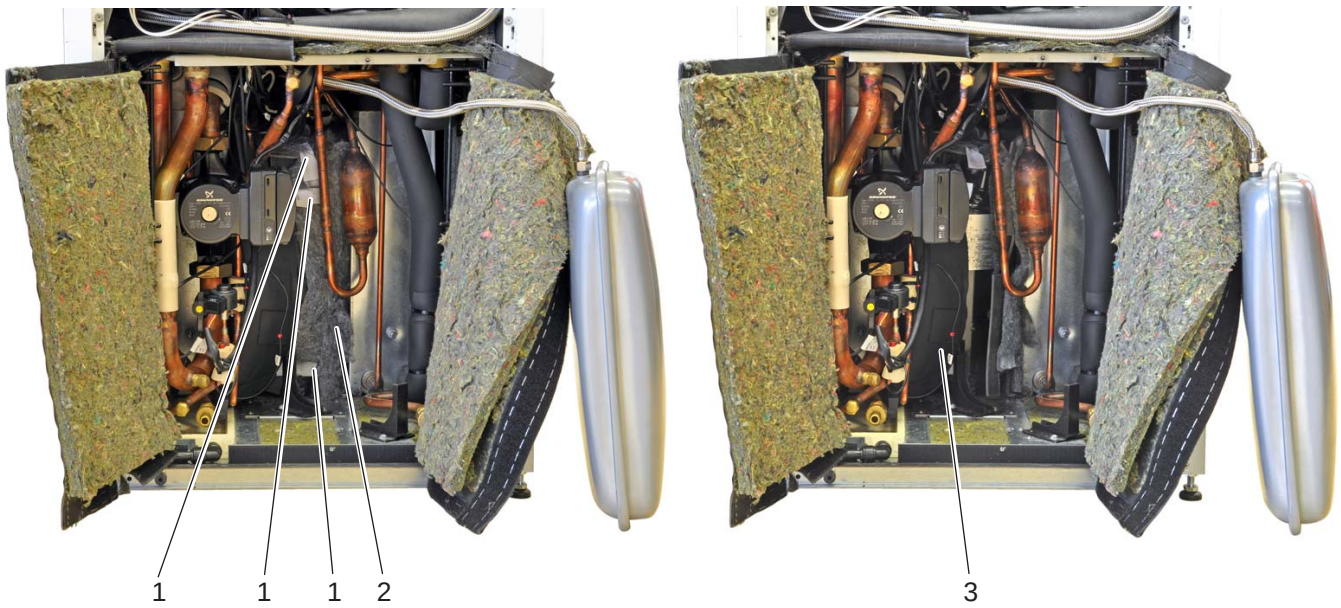
Figure 62 - Replacing the refrigerant high pressure switch - 2



1. Screw
2. Bracket
3. Sound insulation
4. Velcro strip
5. Velcro strip (compressor)

5. From the front side, release the 3 velcro strips (1) on the compressor insulation (2) and open the compressor insulation (2).

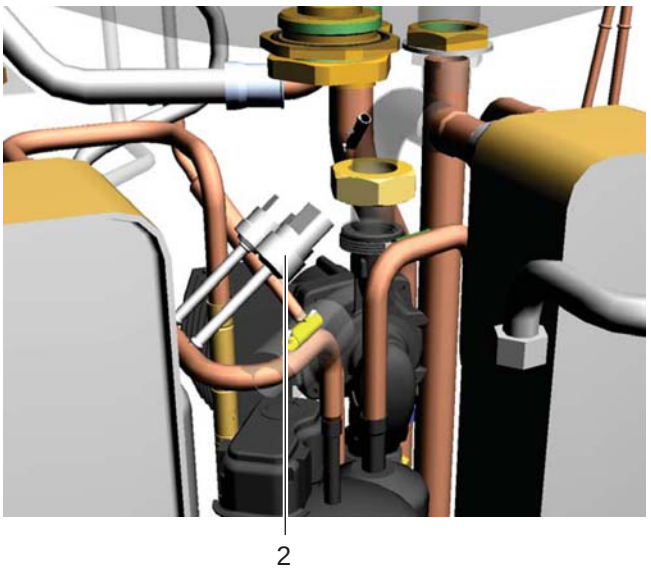
Figure 63 - Replacing the refrigerant high pressure switch - 3



1. Velcro strip
2. Compressor insulation
3. Compressor

6. From the rear side, remove the compressor insulation.
7. Use a welding blanket (1) to protect the components that surround the refrigerant high pressure sensor (2).
8. Place 2 wet cooling clamps (3) on the refrigerant high pressure sensor (2) body.
9. Braze the refrigerant high pressure sensor piping.
10. Remove the refrigerant high pressure sensor (2).

Figure 64 - Replacing the refrigerant high pressure sensor - 3



1. Welding blanket (not illustrated)
2. Refrigerant high pressure sensor
3. Cooling clamp (not illustrated)

Installation

1. Proceed in reverse order.

2.2.24. Replacing a thermistor (except R10T)

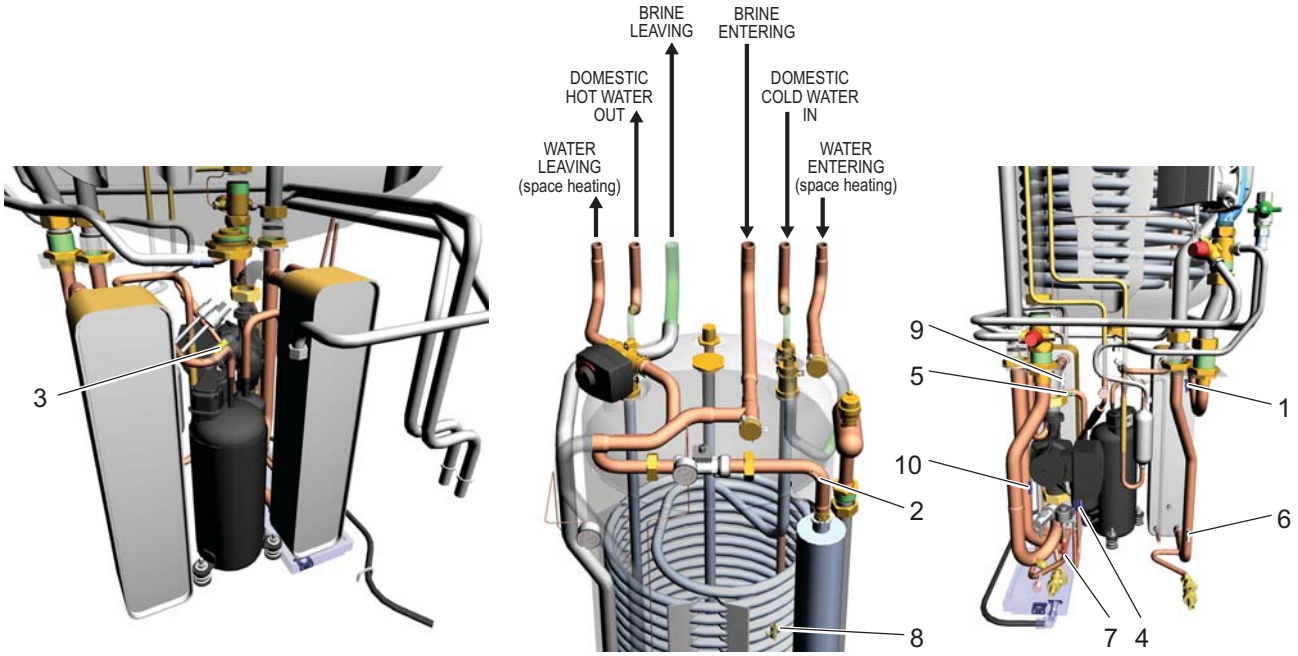
2.2.24.1 Preliminary actions

1. Remove the front panel, refer to "Removing the front panel" on page 83.
2. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.

2.2.24.2 Procedure

The position of all thermistors (except R1T out and R10T) is illustrated in "Thermistor location" on page 141.

Figure 65 - Thermistor location



1. R1T in	6. R4T in
2. R2T in	7. R4T out
3. R2T out	8. R5T in
4. R3T in	9. R5T out
5. R3T out	10. R6T out

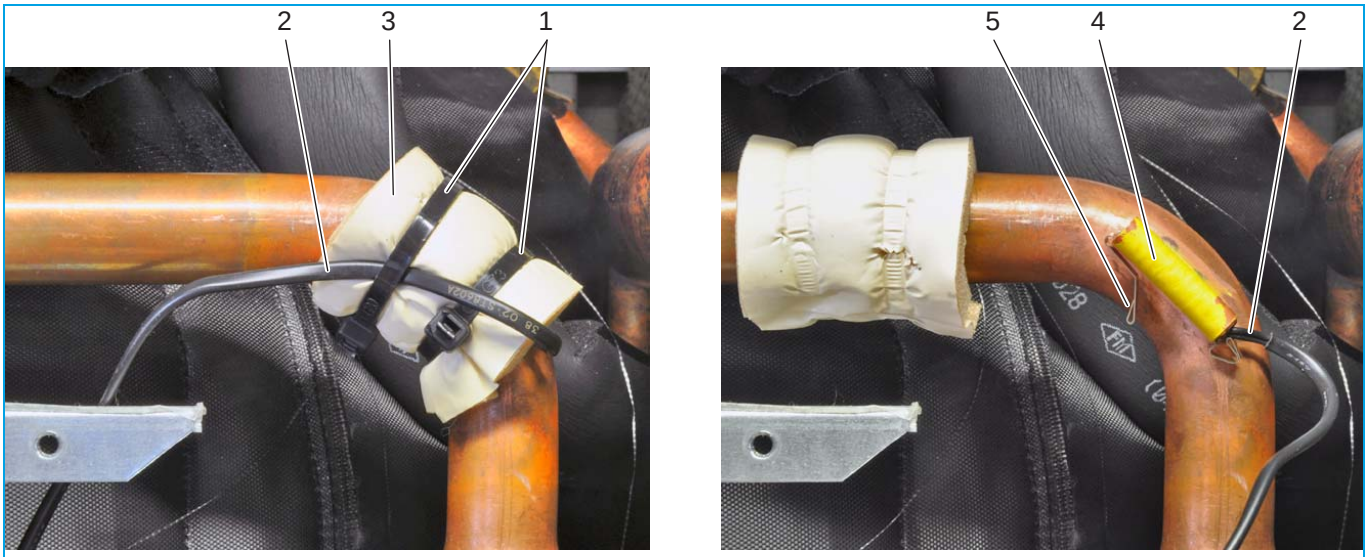
Thermistor	Processed on PCB	Connector: pin	Access Information
R1T in (outlet water)	A1P	X5A: 1-2	Access via front of heat pump module, displace water expansion vessel, refer to "Replacing the water expansion vessel" on page 121.
R2T in (after BUH)	A1P	X6A: 1-2	Access via front of heat pump module.
R3T in (refrigerant liquid)	A1P	X7A: 1-2	Access via front of heat pump module, displace water expansion vessel, refer to "Replacing the water expansion vessel" on page 121.
R4T in (inlet water)	A1P	X8A: 5-6	
R5T in (domestic hot water tank)	A1P	X9A: 1-2	Turn the pivoting power input section, open domestic hot water tank insulation.
R1T out (ambient air)	A9P	X5M: 11-12	Outdoor sensor.
R2T out (discharge) R3T out (suction) R4T out (2 phase Tx) R5T out (brine entering)	A9P A9P A9P A9P	X12A: 1-2 X12A: 3-4 X12A: 5-6 X12A: 7-8	These 4 thermistors must be replaced together. Access via front of heat pump module for R3T, R4T and R5T; displace water expansion vessel, refer to "Replacing the water expansion vessel" on page 121. Access via rear of heat pump module for R2T; displace brine expansion vessel, refer to "Replacing the water expansion vessel" on page 121 and open rear of heat pump module.
R6T out (brine leaving)	A9P	X13A: 1-2	Access via front of heat pump module, displace water expansion vessel, refer to "Opening the sound insulation of the heat pump module (front side only)" on page 87.

Removal

The procedure below showing R2T in can be used for all thermistors except R10T.

1. Cut the tie wraps (1) that fix the insulation (3) and the sensor wire (2).
2. Slide the insulation (3) aside.

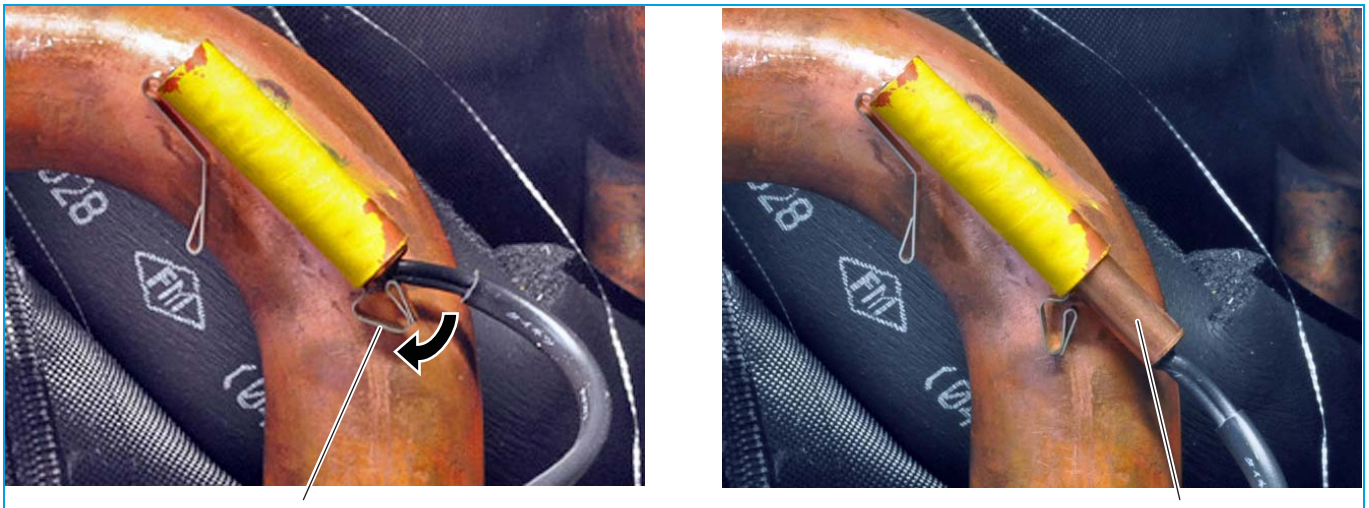
Figure 66 - Replacing a temperature sensor - 1



1. Tie wrap
2. Sensor wire
3. Insulation
4. Sensor holder
5. Clip

1. Press the clip (1) that fixes the sensor (2).
2. Remove the sensor (2) from the sensor holder (3).

Figure 67 - Replacing a temperature sensor - 2



1. Clip
2. Sensor
3. Sensor holder

Installation

1. Proceed in reverse order.

2.2.25. Replacing temperature sensor R10T

2.2.25.1 Preliminary actions

1. Remove the front panel, refer to "Removing the front panel" on page 83.
2. Remove the switch box cover, refer to "Removing the switch box cover" on page 87.
3. Remove the inverter PCB, refer to "Procedure: replacing the A10P PCB" on page 95.

2.2.25.2 Procedure

Removal

1. Loosen and remove the 5 screws (1) that fix PCB A10P (3) to the frame (4).
2. Loosen and remove the 2 screws (2) that fix the heatsink to the frame (4).
3. Unplug connector X111A (6) on the A10P PCB (3).

CAUTION

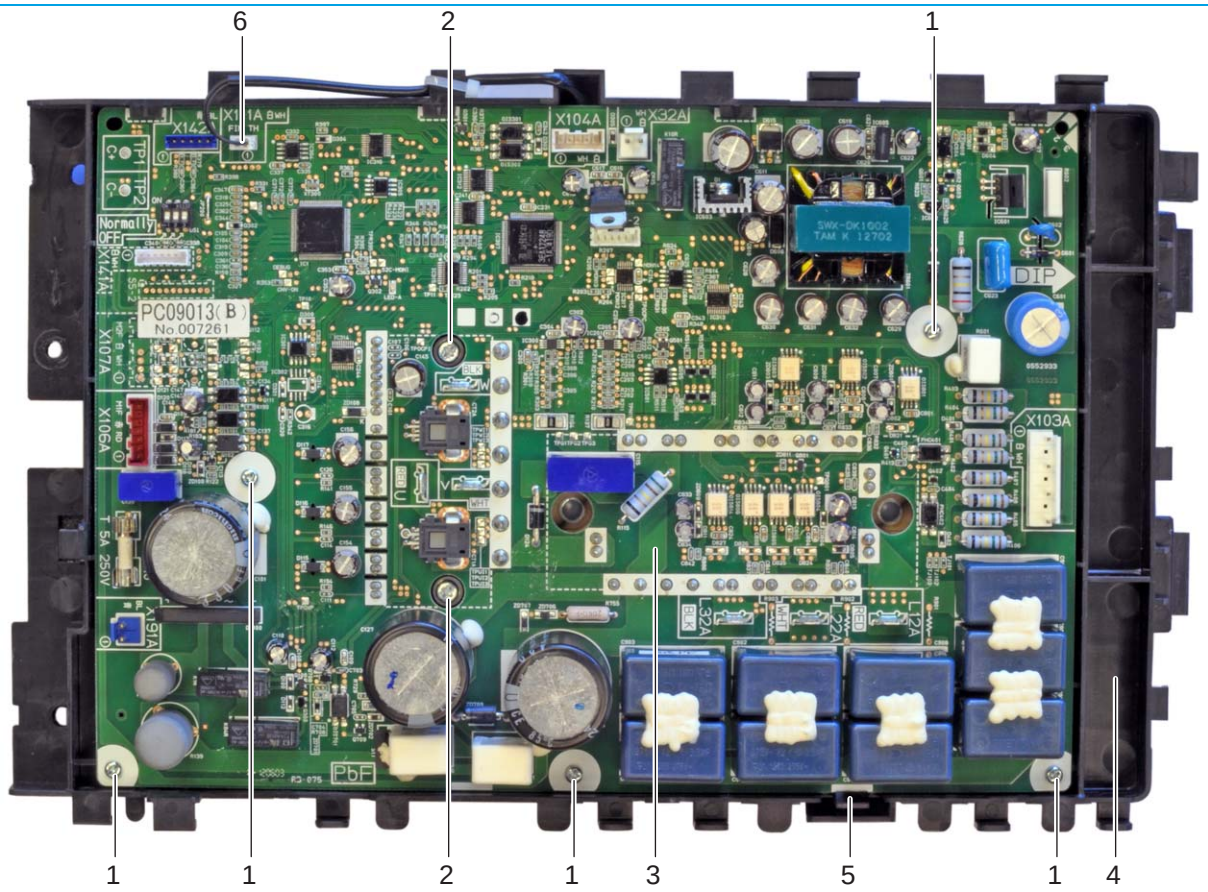
Removing the PCB A10P (3) from the frame (4) will expose the heat sink surface to which heat sink compound is applied.

Do not touch the heat sink.

Keep the heat sink compound clean to ensure good thermal contact after re-installation.

4. Press the latch (5) and remove the A10P PCB (3) from the frame (4).
5. Put the PCB A10P (3) upside down on a clean surface.

Figure 68 - Replacing temperature sensor R10T



1. Screw	4. Frame
2. Screw	5. Latch
3. A10P PCB	6. X111A

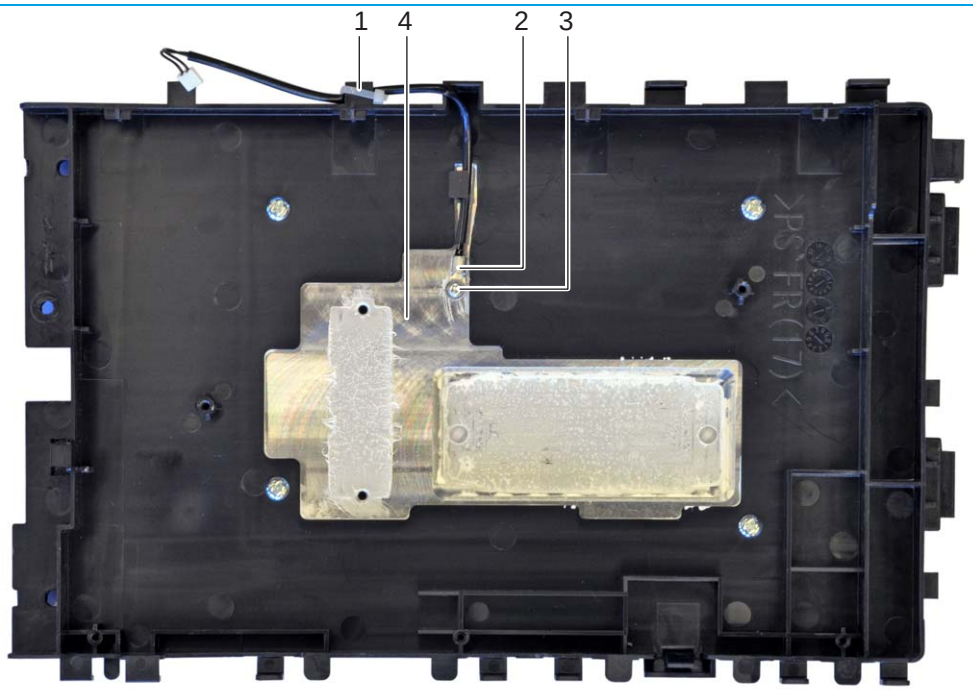
CAUTION

Do not touch the heat sink.

Keep the heat sink compound clean to ensure good thermal contact after re-installation.

6. Cut the tie wrap (1) that fixes the RT10T (3).
7. Loosen and remove the screw that fixes RT10T (3) to the heatsink (4).
8. Remove RT10T (3).

Figure 69 - Replacing temperature sensor R10T



1. Tie wrap	3. R10T
2. Screw	4. Heat sink with heat conductive paste

Installation

CAUTION

If required, additional heat conductive paste can be applied to ensure good heat transfer between the heat sink and A10P PCB (part number heat sink compound: 9993008P).

1. Proceed in reverse order.

Part 4. Maintenance

1. Yearly maintenance intervals and procedures

Following items should be checked on the product at least once a year:

- Fluid pressure of Space Heating and brine circuit
- Brine leakage
- Relief valve hoses
- Pressure relief valves of Space Heating and brine circuit
- Pressure relief valve of Domestic Hot Water tank
- Filters
- Draining of the Domestic Hot Water tank
- Anode
- Descaling and chemical disinfection
- Switch box

2. Maintenance procedures

WARNING

Before performing any maintenance, power off the unit.

INFORMATION

After all checks are made, make sure the water and brine circuits are filled properly again and fluid pressures are okay (1 - 2 bar).

The following procedures describe how to perform the maintenance on each items.

2.1. Checking fluid pressure of Space Heating and brine circuit

Actions	Remarks
Check if fluid pressure between 1 and 2 bar.	Manometers are located under grey flap on front panel.
If pressure < 1 bar, add fluid.	Do not add to over 2 bar.

2.2. Checking for brine leakage

Actions	Remarks
Carefully check if brine leakage is noticeable around the inside of the unit, mainly in the compressor department.	Because the brine piping might sweat in the compressor department, a small drain pan is mounted.
Open the sound insulation jacket and check if brine leakage is noticeable inside this enclosed volume. 	

2.3. Checking the pressure relief valve hose

Actions	Remarks
Check whether the pressure relief valve hose is positioned appropriately to drain the water.	

2.4. Checking the pressure relief valves of Space Heating and brine circuit

Actions	Remarks

Open the valve and check the correct operation:
• If the fluid flow is high, no blockage is suspected.
• If the fluid flow is low or contains debris or dirt:
  • Open the valve until fluid is without dirt.
  • Flush the system and install an additional water filter.
	A magnetic cyclone filter is to be preferred.
	Refer to "Safety valve SV1, SV2 (pressure relief valve)" on page 60.

Make sure to check the water/brine pressure again after this check as it might have dropped. When below 1 bar, add fluid.	Do not add to over 2 bar.

WARNING

Discharged fluid may be very hot!

2.5. Checking the relief valve of the Domestic Hot Water tank - field supply

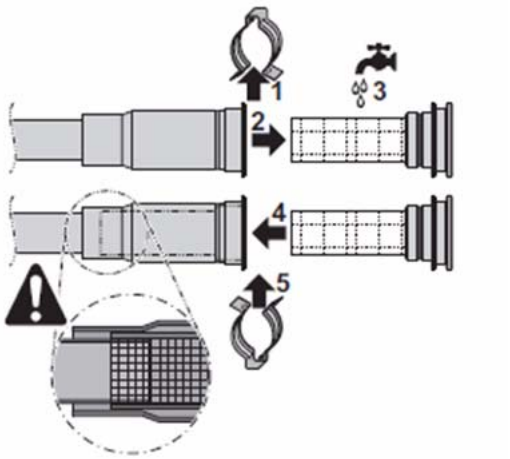
Actions	Remarks

Open the valve and check the correct operation:
• If the fluid flow is high, no blockage is suspected.
• If the fluid flow is low or contains debris or dirt:
  • Open the valve until fluid is without dirt.
  • Flush and clean the tank and piping between relief valve and cold water inlet.
	Make sure that all taps and air vent are open, otherwise the tank might be sucked vacuum and the water will not move.

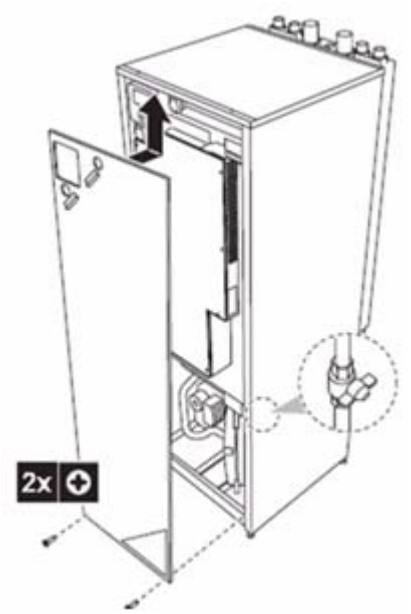
WARNING

Discharged fluid may be very hot!

2.6. Checking the filters of Space Heating and brine circuit

Actions	Remarks
Follow the actions in below picture:  	• The filters are located on top of the unit. • They are horizontally installed, so there is a possibility that some fluid comes out when removing the filter cartridges. Use a small container to collect the fluids. • Handle the filter with care. Do NOT use excessive force when you reinsert the filter so as NOT to damage the water filter mesh. • Make sure the snap ring is correctly located or leakage might occur. Refer to "Cleaning the brine filter" on page 96 and "Cleaning the water filter" on page 98.

2.7. Draining the Domestic Hot Water tank

Actions	Remarks
• Open the front panel. • The drain hose is located at the right side of the unit. Cut the tie wraps or tape and bring the flexible drain hose forward. 	• Make sure that all taps and air vent are open, otherwise the tank might be sucked vacuum and the water will not be fully drained.

2.8. Anode

Actions	Remarks
No maintenance or replacement required.	

2.9. Descaling and chemical disinfection

Actions	Remarks
• Depending on water quality and set temperature, scale can deposit on the heat exchanger inside the domestic hot water tank and can restrict heat transfer. For this reason, descaling of the heat exchanger may be required at certain intervals. • If the applicable legislation requires a chemical disinfection in specific situations, involving the domestic hot water tank, please be aware that the domestic hot water tank is a stainless steel cylinder containing an aluminium anode. We recommend to use a non-chloride based disinfectant approved for use with water intended for human consumption.	When using means for descaling or chemical disinfection, it must be ensured that the water quality remains compliant with EU directive 98/83 EC.

2.10. Checking the Switch box

Actions	Remarks
• Using an ohmmeter, check for correct operation of contactors K1M, K2M, K3M and K5M. • All contacts of these contactors must be in open position when the power is turned OFF. • Carry out a thorough visual inspection of the switch box and look for obvious defects such as loose connections or defective wiring.	Refer to "Backup heater E1H, E2H" on page 53.

Part 5. Appendix

1. Field settings

For more information, refer to table on next pages.

Figure 70 - Field settings table

Field settings table

Breadcrumb	Field code	Setting name			Range, step **Default value**	Installer setting at variance with default value Date	 Value
User settings							
└ Preset values							
└ Room temperature							
7.4.1.1		Comfort (heating)		R/W	[3-07]~[3-06], step: A.3.2.4 **21°C**		
7.4.1.2		Eco (heating)		R/W	[3-07]~[3-06], step: A.3.2.4 **19°C**		
└ LWT main							
7.4.2.1	[8-09]	Comfort (heating)		R/W	[9-01]~[9-00], step: 1°C **55°C**		
7.4.2.2	[8-0A]	Eco (heating)		R/W	[9-01]~[9-00], step: 1°C **45°C**		
7.4.2.5		Comfort (heating)		R/W	-10~10°C, step: 1°C **0°C**		
7.4.2.6		Eco (heating)		R/W	-10~10°C, step: 1°C **-2°C**		
└ Tank temperature							
7.4.3.1	[6-0A]	Storage comfort		R/W	30~[6-0E]°C, step: 1°C **60°C**		
7.4.3.2	[6-0B]	Storage eco		R/W	30~min(50, [6-0E]) °C, step: 1°C **45°C**		
7.4.3.3	[6-0C]	Reheat		R/W	30~min(50, [6-0E]) °C, step: 1°C **45°C**		
└ Quiet level							
7.4.4				R/W	**0: Level 1 (*)** 1: Level 2 2: Level 3		
Installer settings							
└ System layout							
└ Standard							
A.2.1.1	[E-00]	Unit type		R/O	**5: Ground source**		
A.2.1.2	[E-01]	Compressor type		R/O	**1: 16**		
A.2.1.3	[E-02]	Indoor software type		R/O	**1: Type 2**		
A.2.1.5	[5-0D]	BUH type		R/O	**4: 3PN,(1/2)**		
A.2.1.6	[D-01]	Preferential kWh rate		R/W	**0: No** 1: Active open 2: Active closed		
A.2.1.7	[C-07]	Unit control method		R/W	**0: LWT control** 1: Ext RT control 2: RT control		
A.2.1.8	[7-02]	Number of LWT zones		R/W	**0: 1 LWT zone** 1: 2 LWT zones		
A.2.1.9	[F-0D]	Pump operation mode		R/W	0: Continuous **1: Sample** ([C-07] = 0) 2: Request ([C-07] ≠ 0)		
A.2.1.A	[E-04]	Power saving possible		R/O	**0: No**		
A.2.1.B		User interface location		R/W	0: At unit **1: In room**		
└ Options							
A.2.2.4	[C-05]	Contact type main		R/W	**1: Thermo ON/OFF** 2: C/H request		
A.2.2.5	[C-06]	Contact type add.		R/W	**1: Thermo ON/OFF** 2: C/H request		
A.2.2.6.1	[C-02]	Digital I/O PCB	Ext. backup heat src	R/W	**0: No** 1: Bivalent		
A.2.2.6.2	[D-07]	Digital I/O PCB	Solar kit	R/O	**0: No (*)**		
A.2.2.6.3	[C-09]	Digital I/O PCB	Alarm output	R/W	**0: Normally open** 1: Normally closed		
A.2.2.7	[D-04]	Demand PCB		R/W	**0: No** 1: Power consumption control		
A.2.2.8	[D-08]	External kWh meter 1		R/W	**0: No**		
A.2.2.9	[D-09]	External kWh meter 2		R/W	**0: No**		
A.2.2.A	[D-02]	DHW pump		R/W	**0: No** 1: Secondary rtrn ([E-06]=1) 2: Disinf. Shunt ([E-06]=1)		
A.2.2.B	[C-08]	External sensor		R/W	**0: No** 1: Outdoor sensor 2: Room sensor		
└ Capacities							
A.2.3.2	[6-03]	BUH: step 1		R/W	0~10kW, step: 0,2kW **3kW**		
A.2.3.3	[6-04]	BUH: step 2		R/W	0~10kW, step: 0,2kW **3kW**		
Space operation							
└ LWT settings							
└ Main							
A.3.1.1.1		LWT setpoint mode		R/W	0: Absolute **1: Weather dep.** 2: Abs + scheduled 3: WD + scheduled		
A.3.1.1.2.1	[9-01]	Temperature range	Minimum temp (heating)	R/W	15~37°C, step: 1°C **24°C**		
A.3.1.1.2.2	[9-00]	Temperature range	Maximum temp (heating)	R/W	37~65°C, step: 1°C **65°C**		
A.3.1.1.3	[1-00]	Set weather-dependent heating	Low ambient temp. for LWT main zone heating WD curve.	R/W	-20~5°C, step: 1°C **-20°C**		
A.3.1.1.3	[1-01]	Set weather-dependent heating	High ambient temp. for LWT main zone heating WD curve.	R/W	10~20°C, step: 1°C **15°C**		
A.3.1.1.3	[1-02]	Set weather-dependent heating	Leaving water value for low ambient temp. for LWT main zone heating WD curve.	R/W	[9-00]~[9-01], step: 1°C **60°C**		
A.3.1.1.3	[1-03]	Set weather-dependent heating	Leaving water value for high ambient temp. for LWT main zone heating WD curve.	R/W	[9-00]~min(45,[9-01]), step: 1°C **25°C**		
A.3.1.1.5	[8-05]	Modulated LWT		R/W	**0: No** 1: Yes		
A.3.1.1.6.1	[F-0B]	Shut-off valve	Thermo On/OFF	R/W	**0: No** 1: Yes		
A.3.1.1.7	[9-0B]	Emitter type		R/W	**0: Quick** 1: Slow		
└ Additional							
A.3.1.2.1		LWT setpoint mode		R/W	0: Absolute **1: Weather dep.** 2: Abs + scheduled 3: WD + scheduled		
A.3.1.2.2.1	[9-05]	Temperature range	Minimum temp (heating)	R/W	15~37°C, step: 1°C **24°C**		

(*) This setting is not applicable for this unit. Do not change the default value.

Field settings table

Breadcrumb	Field code	Setting name			Range, step **Default value**	Installer setting at variance with default value Date	 Value
A.3.1.2.2.2	[9-06]	Temperature range	Maximum temp (heating)	R/W	37~65°C, step: 1°C **65°C**		
A.3.1.2.3	[0-00]	Set weather-dependent heating	Leaving water value for high ambient temp. for LWT add zone heating WD curve.	R/W	[9-05]~min(45,[9-06])°C, step: 1°C **25°C**		
A.3.1.2.3	[0-01]	Set weather-dependent heating	Leaving water value for low ambient temp. for LWT add zone heating WD curve.	R/W	[9-05]~[9-06]°C, step: 1°C **60°C**		
A.3.1.2.3	[0-02]	Set weather-dependent heating	High ambient temp. for LWT add zone heating WD curve.	R/W	10~20°C, step: 1°C **15°C**		
A.3.1.2.3	[0-03]	Set weather-dependent heating	Low ambient temp. for LWT add zone heating WD curve.	R/W	-20~5°C, step: 1°C **-20°C**		
└ Delta T emitter							
A.3.1.3.1	[9-09]	Delta T emitter	Heating	R/W	3~10°C, step: 1°C **8°C**		
└ Room thermostat							
A.3.2.1.1	[3-07]	Room temp. range	Minimum temp (heating)	R/W	12~18°C, step: A.3.2.4 **12°C**		
A.3.2.1.2	[3-06]	Room temp. range	Maximum temp (heating)	R/W	18~30°C, step: A.3.2.4 **30°C**		
A.3.2.2	[2-0A]	Room temp. offset		R/W	-5~5°C, step: 0,5°C **0°C**		
A.3.2.3	[2-09]	Ext. room sensor offset		R/W	-5~5°C, step: 0,5°C **0°C**		
A.3.2.4		Room temp. step		R/W	**0: 1 °C** 1: 0,5 °C		
└ Operation range							
A.3.3.1	[4-02]	Space heating OFF temp		R/W	14~35°C, step: 1°C **35°C**		
└ Domestic hot water (DHW)							
└ Type							
A.4.1	[6-0D]			R/W	0: Reheat only **1: Reheat + sched.** 2: Scheduled only		
└ Setpoint readout							
A.4.3.1		Setpoint readout type		R/W	**0: Temperature** 1: Graphical		
A.4.3.2.1		Conversion persons	1 person	R/W	30~80°C, step: 1°C **42°C**		
A.4.3.2.2		Conversion persons	2 persons	R/W	0~20°C, step: 1°C **6°C**		
A.4.3.2.3		Conversion persons	3 persons	R/W	0~20°C, step: 1°C **15°C**		
A.4.3.2.4		Conversion persons	4 persons	R/W	0~20°C, step: 1°C **17°C**		
A.4.3.2.5		Conversion persons	5 persons	R/W	0~20°C, step: 1°C **1°C**		
A.4.3.2.6		Conversion persons	6 persons	R/W	0~20°C, step: 1°C **1°C**		
└ Disinfection							
A.4.4.1	[2-01]	Disinfection		R/W	0: No **1: Yes**		
A.4.4.2	[2-00]	Operation day		R/W	0: Each day 1: Monday 2: Tuesday 3: Wednesday 4: Thursday **5: Friday** 6: Saturday 7: Sunday		
A.4.4.3	[2-02]	Start time		R/W	0~23 hour, step: 1 hour **23**		
A.4.4.4	[2-03]	Temperature target		R/W	**60°C**		
A.4.4.5	[2-04]	Duration		R/W	**60 min**		
└ Maximum setpoint							
A.4.5	[6-0E]			R/W	**60°C**		
└ SP mode							
A.4.6		SP mode		R/W	**0: Absolute** 1: Weather dep.		
└ Weather dependant curve							
A.4.7	[0-0B]	Weather-dependent curve	DHW setpoint for high ambient temp. for DHW WD curve.	R/W	35~[6-0E]°C, step: 1°C **45°C**		
A.4.7	[0-0C]	Weather-dependent curve	DHW setpoint for low ambient temp. for DHW WD curve.	R/W	45~[6-0E]°C, step: 1°C **60°C**		
A.4.7	[0-0D]	Weather-dependent curve	High ambient temp. for DHW WD curve.	R/W	10~20°C, step: 1°C **15°C**		
A.4.7	[0-0E]	Weather-dependent curve	Low ambient temp. for DHW WD curve.	R/W	-20~5°C, step: 1°C **-20°C**		
└ Heat sources							
└ Backup heater							
A.5.1.1	[4-00]	Operation mode		R/W	0: Limit **1: Enable** 2: Only DHW		
A.5.1.2		Auto emergency operation		R/W	**0: Manual** 1: Automatic		
A.5.1.3	[4-07]	Enable BUH step 2		R/W	0: No **1: Yes**		
A.5.1.4	[5-01]	Equilibrium temp.		R/W	-15~35°C, step: 1°C **0°C**		
└ System operation							
└ Auto restart							
A.6.1	[3-00]	Is auto restart of the unit allowed?		R/W	0: No **1: Yes**		
└ Preferential kWh rate							
A.6.2.1	[D-00]	Allowed heaters		R/O	**0: None**		
A.6.2.2	[D-05]	Forced pump OFF		R/W	0: Forced off **1: As normal**		
└ Averaging time							
A.6.4	[1-0A]			R/W	**0: No averaging** 1: 12 hours 2: 24 hours 3: 48 hours 4: 72 hours		
└ Ext amb. sensor offset							
A.6.5	[2-0B]			R/W	-5~5°C, step: 0,5°C **0°C**		
└ Forced defrost							

(*) This setting is not applicable for this unit. Do not change the default value.

Field settings table					Installer setting at variance with default value	
Breadcrumb	Field code	Setting name		Range, step **Default value**	Date	Value
A.6.6		Are you sure you want to activate the forced defrost function?	R/W	**(*)**		
		└ Brine freezeup temperature				
A.6.9	[A-04]		R/W	0: 0°C 1: -2°C 2: -4°C 3: -6°C 4: -8°C 5: -10°C 6: -12°C **7: -14°C**		
		└ Boiler efficiency				
A.6.A	[7-05]		R/W	**0: Very high (*)** 1: High 2: Medium 3: Low 4: Very low		
	└ Overview settings					
A.8	[0-00]	Leaving water value for high ambient temp. for LWT add zone heating WD curve.	R/W	[9-05]~min(45,[9-06])°C, step: 1°C **25°C**		
A.8	[0-01]	Leaving water value for low ambient temp. for LWT add zone heating WD curve.	R/W	[9-05]~[9-06]°C, step: 1°C **60°C**		
A.8	[0-02]	High ambient temp. for LWT add zone heating WD curve.	R/W	10~20°C, step: 1°C **15°C**		
A.8	[0-03]	Low ambient temp. for LWT add zone heating WD curve.	R/W	-20~5°C, step: 1°C **-20°C**		
A.8	[0-04]	--	R/W	**8**		
A.8	[0-05]	--	R/W	**12**		
A.8	[0-06]	--	R/W	**35**		
A.8	[0-07]	--	R/W	20		
A.8	[0-0B]	Leaving water value for high ambient temp. for DHW WD curve.	R/W	35~[6-0E]°C, step: 1°C **45°C**		
A.8	[0-0C]	Leaving water value for low ambient temp. for DHW WD curve.	R/W	45~[6-0E]°C, step: 1°C **60°C**		
A.8	[0-0D]	High ambient temp. for DHW WD curve.	R/W	10~20°C, step: 1°C **15°C**		
A.8	[0-0E]	Low ambient temp. for DHW WD curve.	R/W	-20~5°C, step: 1°C **-20°C**		
A.8	[1-00]	Low ambient temp. for LWT main zone heating WD curve.	R/W	-20~5°C, step: 1°C **-20°C**		
A.8	[1-01]	High ambient temp. for LWT main zone heating WD curve.	R/W	10~20°C, step: 1°C **15°C**		
A.8	[1-02]	Leaving water value for low ambient temp. for LWT main zone heating WD curve.	R/W	[9-00]~[9-01], step: 1°C **60°C**		
A.8	[1-03]	Leaving water value for high ambient temp. for LWT main zone heating WD curve.	R/W	[9-00]~min(45,[9-01]), step: 1°C **25°C**		
A.8	[1-04]	--	R/W	**0**		
A.8	[1-05]	--	R/W	**0**		
A.8	[1-06]	--	R/W	**20**		
A.8	[1-07]	--	R/W	**35**		
A.8	[1-08]	--	R/W	**22**		
A.8	[1-09]	--	R/W	**18**		
A.8	[1-0A]	What is the averaging time for the outdoor temp?	R/W	**0: No averaging** 1: 12 hours 2: 24 hours 3: 48 hours 4: 72 hours		
A.8	[2-00]	When should the disinfection function be executed?	R/W	0: Each day 1: Monday 2: Tuesday 3: Wednesday 4: Thursday **5: Friday** 6: Saturday 7: Sunday		
A.8	[2-01]	Should the disinfection function be executed?	R/W	0: No **1: Yes**		
A.8	[2-02]	When should the disinfection function start?	R/W	0~23 hour, step: 1 hour **23**		
A.8	[2-03]	What is the disinfection target temperature?	R/W	**60°C**		
A.8	[2-04]	How long must the tank temperature be maintained?	R/W	**60 min**		
A.8	[2-05]	Room antifrost temperature	R/W	4~16°C, step: 1°C **12°C**		
A.8	[2-06]	Room frost protection	R/W	0: Disabled **1: Enabled**		
A.8	[2-09]	Adjust the offset on the measured room temperature	R/W	-5~5°C, step: 0,5°C **0°C**		
A.8	[2-0A]	Adjust the offset on the measured room temperature	R/W	-5~5°C, step: 0,5°C **0°C**		
A.8	[2-0B]	What is the required offset on the measured outdoor temp.?	R/W	-5~5°C, step: 0,5°C **0°C**		
A.8	[3-00]	Is auto restart of the unit allowed?	R/W	0: No **1: Yes**		
A.8	[3-01]	--	R/W	**0**		
A.8	[3-02]	--	R/W	**1**		
A.8	[3-03]	--	R/W	**4**		
A.8	[3-04]	--	R/W	**2**		
A.8	[3-05]	--	R/W	**1**		
A.8	[3-06]	What is the maximum desired room temperature in heating?	R/W	18~30°C, step: A.3.2.4 **30°C**		
A.8	[3-07]	What is the mimimum desired room temperature in heating?	R/W	12~18°C, step: A.3.2.4 **12°C**		
A.8	[3-08]	--	R/W	**35**		
A.8	[3-09]	--	R/W	**15**		
A.8	[4-00]	What is the BUH operation mode?	R/W	0: Limit **1: Enable** 2: Only DHW		
A.8	[4-01]	--	R/O	**0**		
A.8	[4-02]	Below which outdoor temperature is heating allowed?	R/W	14~35°C, step: 1°C **35°C**		
A.8	[4-03]	--	R/W	**3**		
A.8	[4-04]	--	R/W	**2**		
A.8	[4-05]	--	R/W	**0**		
A.8	[4-06]	--	R/W	**0**		

(*) This setting is not applicable for this unit. Do not change the default value.

Field settings table					Installer setting at variance with default value	
Breadcrumb	Field code	Setting name		Range, step **Default value**	Date	Value
A.8	[4-07]	Enable the second step of the backup heater?	R/W	0: No **1: Yes**		
A.8	[4-08]	Which power limitation mode is required on the system?	R/W	**0: No limitation** 1: Continuous 2: Digital inputs		
A.8	[4-09]	Which power limitation type is required?	R/W	**0: Current** 1: Power		
A.8	[4-0B]	--	R/W	**1**		
A.8	[4-0D]	--	R/W	**3**		
A.8	[5-00]	Is backup heater or boiler operation allowed above equilibrium temperature during space heating operation?	R/W	0: Allowed **1: Not allowed**		
A.8	[5-01]	What is the equilibrium temperature for the building?	R/W	-15~35°C, step: 1°C **0°C**		
A.8	[5-02]	--	R/O	**0**		
A.8	[5-03]	--	R/W	**0**		
A.8	[5-04]	--	R/W	**10**		
A.8	[5-05]	What is the requested limit for DI1?	R/W	0~50 A, step: 1 A **50 A**		
A.8	[5-06]	What is the requested limit for DI2?	R/W	0~50 A, step: 1 A **50 A**		
A.8	[5-07]	What is the requested limit for DI3?	R/W	0~50 A, step: 1 A **50 A**		
A.8	[5-08]	What is the requested limit for DI4?	R/W	0~50 A, step: 1 A **50 A**		
A.8	[5-09]	What is the requested limit for DI1?	R/W	0~20 kW, step: 0,5 kW **20 kW**		
A.8	[5-0A]	What is the requested limit for DI2?	R/W	0~20 kW, step: 0,5 kW **20 kW**		
A.8	[5-0B]	What is the requested limit for DI3?	R/W	0~20 kW, step: 0,5 kW **20 kW**		
A.8	[5-0C]	What is the requested limit for DI4?	R/W	0~20 kW, step: 0,5 kW **20 kW**		
A.8	[5-0D]	What type of backup heater installation is used?	R/O	**4: 3PN.(1/2)**		
A.8	[5-0E]	--	R/W	**1**		
A.8	[6-00]	The temperature difference determining the heat pump ON temperature.	R/W	2~20°C, step: 1°C **2°C**		
A.8	[6-01]	The temperature difference determining the heat pump OFF temperature.	R/W	0~10°C, step: 1°C **2°C**		
A.8	[6-02]	--	R/W	**0**		
A.8	[6-03]	What is the capacity of the backup heater step 1?	R/W	0~10kW, step: 0,2kW **3kW**		
A.8	[6-04]	What is the capacity of the backup heater step 2?	R/W	0~10kW, step: 0,2kW **3kW**		
A.8	[6-05]	--	R/W	**0**		
A.8	[6-06]	--	R/W	**0**		
A.8	[6-07]	--	R/W	**0**		
A.8	[6-08]	Reheat hysteresis	R/W	2~20°C, step: 1°C **10°C**		
A.8	[6-09]	--	R/W	**0**		
A.8	[6-0A]	What is the desired comfort storage temperature?	R/W	30~[6-0E]°C, step: 1°C **60°C**		
A.8	[6-0B]	What is the desired eco storage temperature?	R/W	30~min(50, [6-0E]) °C, step: 1°C **45°C**		
A.8	[6-0C]	What is the desired reheat temperature?	R/W	30~min(50, [6-0E]) °C, step: 1°C **45°C**		
A.8	[6-0D]	What is the desired setpoint mode in DHW?	R/W	0: Reheat only **1: Reheat + sched.** 2: Scheduled only		
A.8	[6-0E]	What is the maximum tank temperature setpoint?	R/W	**60°C**		
A.8	[7-00]	--	R/W	**0**		
A.8	[7-01]	--	R/W	**2**		
A.8	[7-02]	How many leaving water temperature zones are there?	R/W	**0: 1 LWT zone** 1: 2 LWT zones		
A.8	[7-03]	PE factor	R/W	0~6, step: 0,1 **2,5**		
A.8	[7-04]	--	R/W	**0**		
A.8	[7-05]	Boiler efficiency	R/W	**0: Very high (*)** 1: High 2: Medium 3: Low 4: Very low		
A.8	[8-00]	Minimum running time for domestic hot water operation.	R/W	0~20 min, step: 1 min **5 min**		
A.8	[8-01]	Maximum running time for domestic hot water operation.	R/W	5~95 min, step: 5 min **30 min**		
A.8	[8-02]	Anti-recycling time.	R/W	0~10 hour, step: 0,5 hour **0,5 hour**		
A.8	[8-03]	--	R/W	**50**		
A.8	[8-04]	Additional running time for the maximum running time.	R/W	0~95 min, step: 5 min **95 min**		
A.8	[8-05]	Allow modulation of the LWT to control the room?	R/W	**0: No** 1: Yes		
A.8	[8-06]	Leaving water temperature maximum modulation.	R/W	1~5°C, step: 1°C **3°C**		
A.8	[8-07]	--	R/W	**18**		
A.8	[8-08]	--	R/W	**20**		
A.8	[8-09]	What is the desired comfort main LWT in heating?	R/W	[9-01]~[9-00], step: 1°C **55°C**		
A.8	[8-0A]	What is the desired eco main LWT in heating?	R/W	[9-01]~[9-00], step: 1°C **45°C**		
A.8	[8-0B]	--	R/W	**13**		
A.8	[8-0C]	--	R/W	**10**		
A.8	[8-0D]	--	R/W	**10**		
A.8	[9-00]	What is the maximum desired LWT for main zone in heating?	R/W	37~65°C, step: 1°C **65°C**		
A.8	[9-01]	What is the mimimum desired LWT for main zone in heating?	R/W	15~37°C, step: 1°C **24°C**		
A.8	[9-02]	--	R/W	**22**		
A.8	[9-03]	--	R/W	**5**		
A.8	[9-04]	--	R/W	**1**		
A.8	[9-05]	What is the mimimum desired LWT for add. zone in heating?	R/W	15~37°C, step: 1°C **24°C**		
A.8	[9-06]	What is the maximum desired LWT for add. zone in heating?	R/W	37~65°C, step: 1°C **65°C**		
A.8	[9-07]	--	R/W	**5**		

(*) This setting is not applicable for this unit. Do not change the default value.

Field settings table					Installer setting at variance with default value	
Breadcrumb	Field code	Setting name		Range, step **Default value**	Date	Value
A.8	[9-08]	--	R/W	**22**		
A.8	[9-09]	What is the desired delta T in heating?	R/W	3~10°C, step: 1°C **8°C**		
A.8	[9-0A]	--	R/W	**5**		
A.8	[9-0B]	What emitter type is connected to the main LWT zone?	R/W	**0: Quick** 1: Slow		
A.8	[9-0C]	Room temperature hysteresis.	R/W	1~6°C, step: 0,5°C **1 °C**		
A.8	[A-00]	--	R/W	**1**		
A.8	[A-01]	--	R/W	**0**		
A.8	[A-02]	--		**0**		
A.8	[A-03]	Maximum heating frequency	R/W	**0: 148Hz** 1: 193Hz		
A.8	[A-04]	Brine freezup temperature	R/W	0: 0°C 1: -2°C 2: -4°C 3: -6°C 4: -8°C 5: -10°C 6: -12°C **7: -14°C**		
A.8	[B-00]	--		**0**		
A.8	[B-01]	--		**0**		
A.8	[B-02]	--		**0**		
A.8	[B-03]	--		**0**		
A.8	[B-04]	--		**0**		
A.8	[C-00]	--	R/O	**1**		
A.8	[C-01]	--	R/W	**0**		
A.8	[C-02]	Is an external backup heat source connected?	R/W	**0: No** 1: Bivalent		
A.8	[C-03]	Bivalent activation temperature.	R/W	-25~25°C, step: 1°C **0°C**		
A.8	[C-04]	Bivalent hysteresis temperature.	R/W	2~10°C, step: 1°C **3°C**		
A.8	[C-05]	What is the thermo request contact type for the main zone?	R/W	**1: Thermo ON/OFF** 2: C/H request		
A.8	[C-06]	What is the thermo request contact type for the add. zone?	R/W	**1: Thermo ON/OFF** 2: C/H request		
A.8	[C-07]	What is the unit control method in space operation?	R/W	**0: LWT control** 1: Ext RT control 2: RT control		
A.8	[C-08]	Which type of external sensor is installed?	R/W	**0: No** 1: Outdoor sensor 2: Room sensor		
A.8	[C-09]	What is the required alarm output contact type?	R/W	**0: Normally open** 1: Normally closed		
A.8	[C-0A]	--	R/O	**0**		
A.8	[C-0C]	--	R/O	**0**		
A.8	[C-0D]	--	R/O	**0**		
A.8	[C-0E]	--	R/O	**0**		
A.8	[D-00]	Which heaters are permitted if prefer. kWh rate PS is cut?	R/O	**0: None**		
A.8	[D-01]	Contact type of preferential kWh rate PS installation?	R/W	**0: No** 1: Active open 2: Active closed		
A.8	[D-02]	Which type of DHW pump is installed?	R/W	**0: No** 1: Secondary rtrn ([E-06]=1) 2: Disinf. Shunt ([E-06]=1)		
A.8	[D-03]	Leaving water temperature compensation around 0°C.	R/W	**0: Disabled** 1: Enabled, shift 2°C (from -2 to 2°C) 2: Enabled, shift 4°C (from -2 to 2°C) 3: Enabled, shift 2°C (from -4 to 4°C) 4: Enabled, shift 4°C (from -4 to 4°C)		
A.8	[D-04]	Is a demand PCB connected?	R/W	**0: No** 1: Power consumption control		
A.8	[D-05]	Is the pump allowed to run if prefer. kWh rate PS is cut?	R/W	0: Forced off **1: As normal**		
A.8	[D-07]	Is a solar kit connected?	R/O	**0: No (*)**		
A.8	[D-08]	Is an external kWh meter used for power measurement?	R/W	**0: No**		
A.8	[D-09]	Is an external kWh meter used for power measurement?	R/W	**0: No**		
A.8	[D-0A]	--	R/O	**0**		
A.8	[D-0B]	--	R/O	**2**		
A.8	[D-0C]	--	R/O	**0**		
A.8	[D-0D]	--	R/O	**0**		
A.8	[D-0E]	--	R/O	**0**		
A.8	[E-00]	Which type of unit is installed?	R/O	**5: Ground source**		
A.8	[E-01]	--	R/O	**1: 16**		
A.8	[E-02]	--	R/O	**1: Type 2**		
A.8	[E-03]	--	R/O	**2**		
A.8	[E-04]	Is the power saving function available on the outdoor unit?	R/O	**0: No**		
A.8	[E-05]	--	R/W	**1**		
A.8	[E-06]	--	R/O	**1**		
A.8	[E-07]	--	R/O	**1**		
A.8	[E-08]	--	R/O	**0**		
A.8	[E-09]	--	R/W	**0**		
A.8	[E-0A]	--	R/O	**0**		
A.8	[F-00]	Pump operation allowed outside range.	R/W	**0: Disabled** 1: Enabled		
A.8	[F-01]	--	R/W	**20**		
A.8	[F-02]	--	R/W	**3**		
A.8	[F-03]	--	R/O	**5**		
A.8	[F-04]	--	R/W	**0**		
A.8	[F-05]	--	R/W	**0**		
A.8	[F-06]	--	R/W	**0**		
A.8	[F-09]	Pump operation during flow abnormality.	R/W	0: Disabled **1: Enabled**		
A.8	[F-0A]	--	R/W	**0**		
A.8	[F-0B]	Close shut-off valve during thermo OFF?	R/W	**0: No** 1: Yes		
A.8	[F-0C]	--	R/W	**1**		
A.8	[F-0D]	What is the pump operation mode?	R/W	0: Continuous **1: Sample** ([C-07] = 0) 2: Request ([C-07] ≠ 0)		

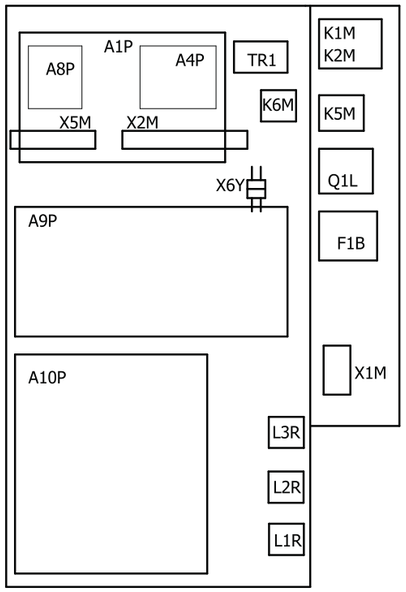
(*) This setting is not applicable for this unit. Do not change the default value.

2. Wiring diagrams

2.1 Wiring diagram 1

Figure 71 - Wiring diagram 1 (switchbox layout)

POSITION IN SWITCH BOX



LEGEND

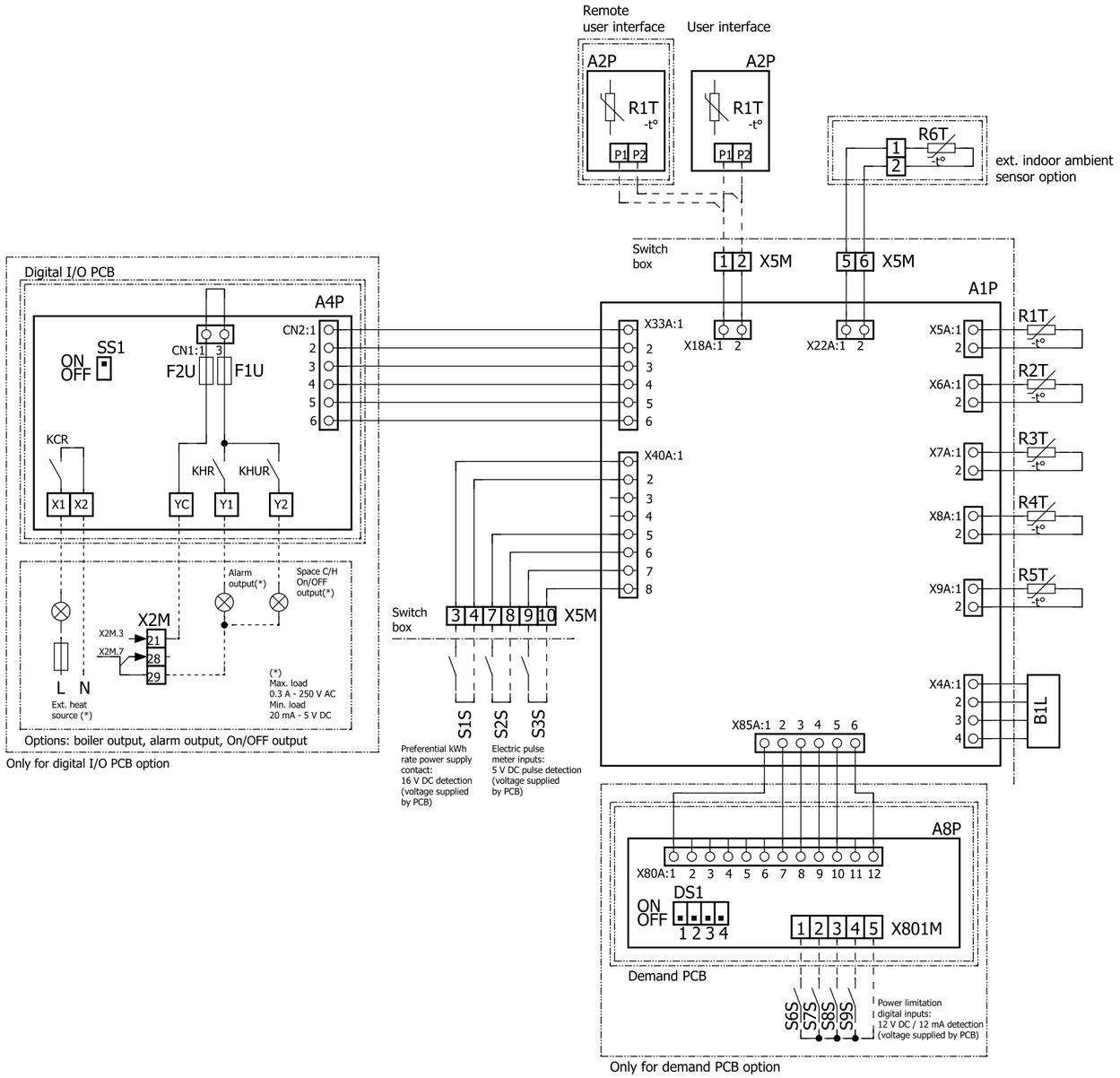
Part n°		Description
A1P		main PCB (hydro)
A2P		user interface PCB
A3P	*	On/OFF thermostat
A3P	*	heat pump convector
A4P	*	digital I/O PCB
A4P	*	receiver PCB (wireless On/OFF thermostat, PC=power circuit)
A8P	*	demand PCB
A9P		main PCB (refrigerant, brine)
A10P		main PCB (inverter)
AP		air purge
B1L		flow sensor
B1PH		high pressure sensor
BS1~BS4		Push button
C1~C4		Capacitor
CN* (A4P)	*	connector
CV		check valve
DR1		drain BRINE
DR2		drain BRINE
DR3		drain WATER
DR4		drain hot water tank
DS1 (A8P)	*	dipswitch
DS1 (A9P)		dipswitch
DS1 (A10P)		dipswitch
E1H		backup heater element (1 kW)
E2H		backup heater element (2 kW)
EXP1		expansion vessel BRINE
EXP2		expansion vessel WATER
F1B		overcurrent fuse backup heater
F1U, F2U (A4P)	*	fuse (5 A, 250 V)
F1U, F2U (A9P)		fuse (35.5 A, 500 V)
F3U~F6U (A9P)		fuse (T, 6.3 A, 250 V)
FI1		filter BRINE SIDE
FI2		filter WATER SIDE
FU1 (A1P)		fuse (T, 6.3 A, 250 V)
H1P~H7P		LED
HAP		LED
K1E		electronic expansion valve
K1M, K2M		contactor backup heater
K5M		safety contactor BUH
K6M		relay
K*R		relay on PCB
L1R~L3R		reactor
L5R		reactor transmission line
M1C		motor (compressor)
M1P		main water supply pump
M2P	#	domestic hot water pump
M3P		brine supply pump
M2S	#	Shut off valve
M3S		3 way valve for floorheating /domestic hot water
MU		muffler
PS		switching power supply
PG1		pressure gauge BRINE
PG2		pressure gauge WATER
PH1E		plate type heat exchanger BRINE REFRIGERANT
PH2E		plate type heat exchanger REFRIGERANT-WATER
Q*DI	#	earth leakage circuit breaker
Q1L		thermal protector backup heater
R1		resistor
R1T (A1P)		outlet water heat temperature sensor (LWC)
R1T (A2P)		ambient sensor user interface
R1T (A3P)	*	ambient sensor On/OFF thermostat
R1T (A9P)		ambient air sensor
R2T (A1P)		after BUH temperature sensor
R2T (A3P)	*	external sensor (floor or ambient)
R2T (A9P)		discharge sensor
R3T (A1P)		refrigerant liquid temperature sensor
R3T (A9P)		suction sensor
R4T (A1P)		inlet water temperature sensor (EWC)
R4T (A9P)		2 phase sensor (Tx)
R5T (A1P)		DHW tank temperature sensor
R5T (A9P)		brine entering water
R6T (A1P)	*	external indoor ambient thermistor
R6T (A9P)		brine leaving water
R10T		heat sink thermistor
R1H (A3P)	*	humidity sensor
S1L		brine flow switch
S1PH		high pressure switch
S1S	#	preferential kWh rate PS contact
S2S	#	electrical meter pulse input 1
S3S	#	electrical meter pulse input 2
S6S-S9S	#	digital power limitation inputs
SS1 (A4P)	*	selector switch
SV1		brine
SV2		water
TR1		power supply transformer
V1R, V2R		IGBT power module
X*H		backup heater connector
X*M		terminal strip
X*Y		connector
Z1C~Z6C		noise filter (ferrit core)
Z1F~Z5F		noise filter

Translation can be found in the installation manual.

* : optional
# : field supply

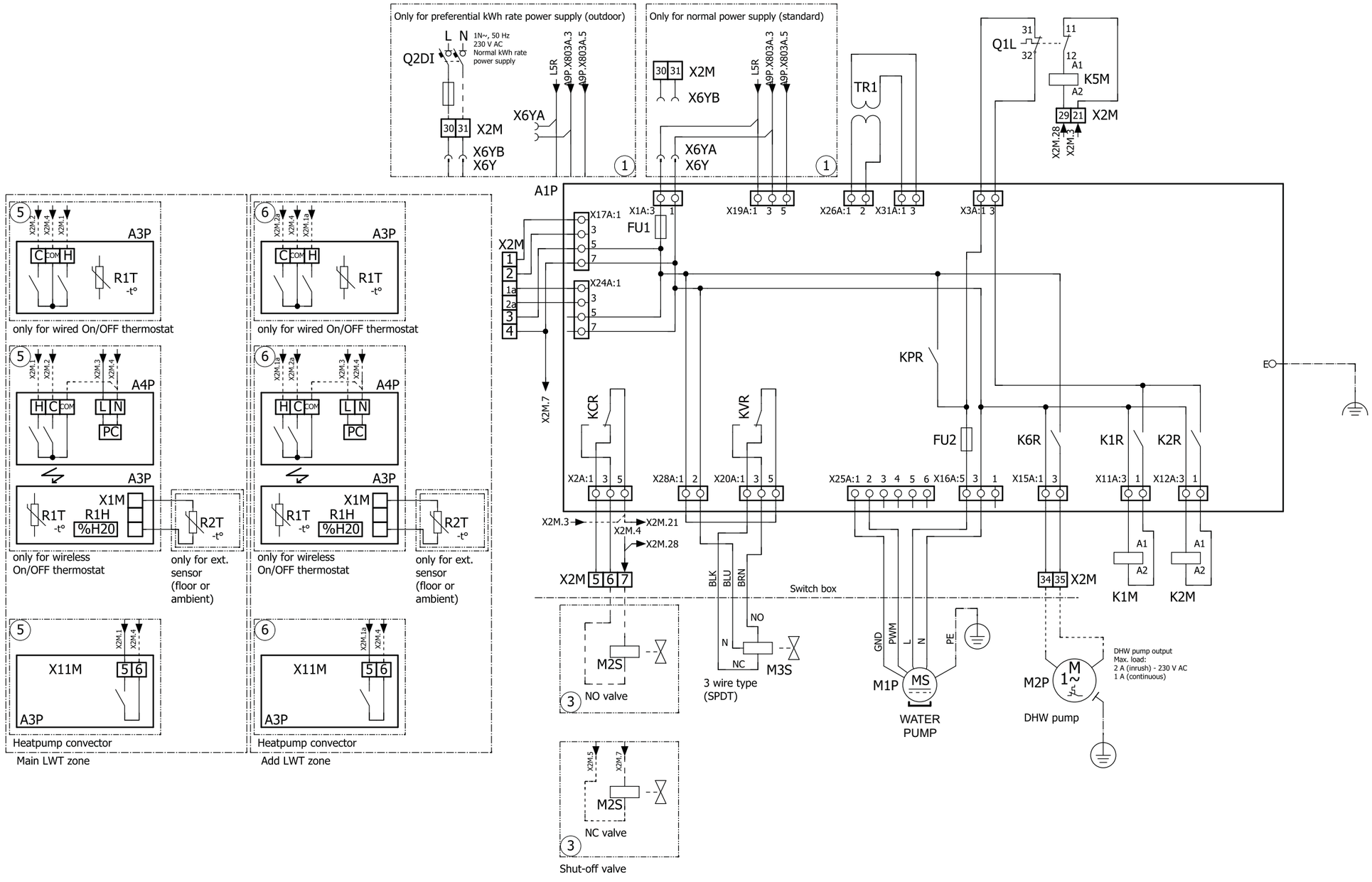
2.2 Wiring diagram 2

Figure 72 - Wiring diagram 2 (PCB A1P / A2P / A4P / A8P)



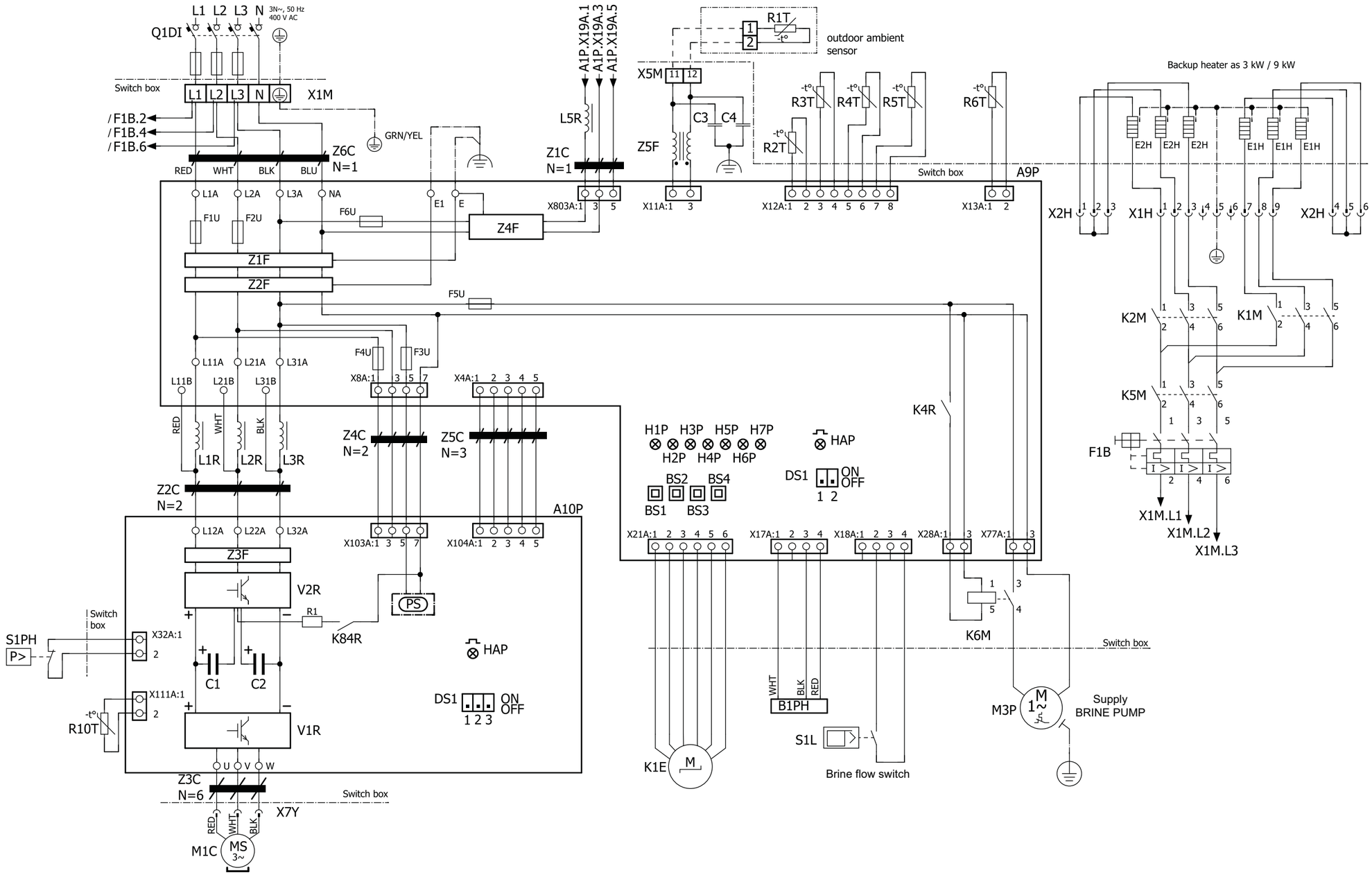
2.3 Wiring diagram 3

Figure 73 - Wiring diagram 3 (PCB A1P)



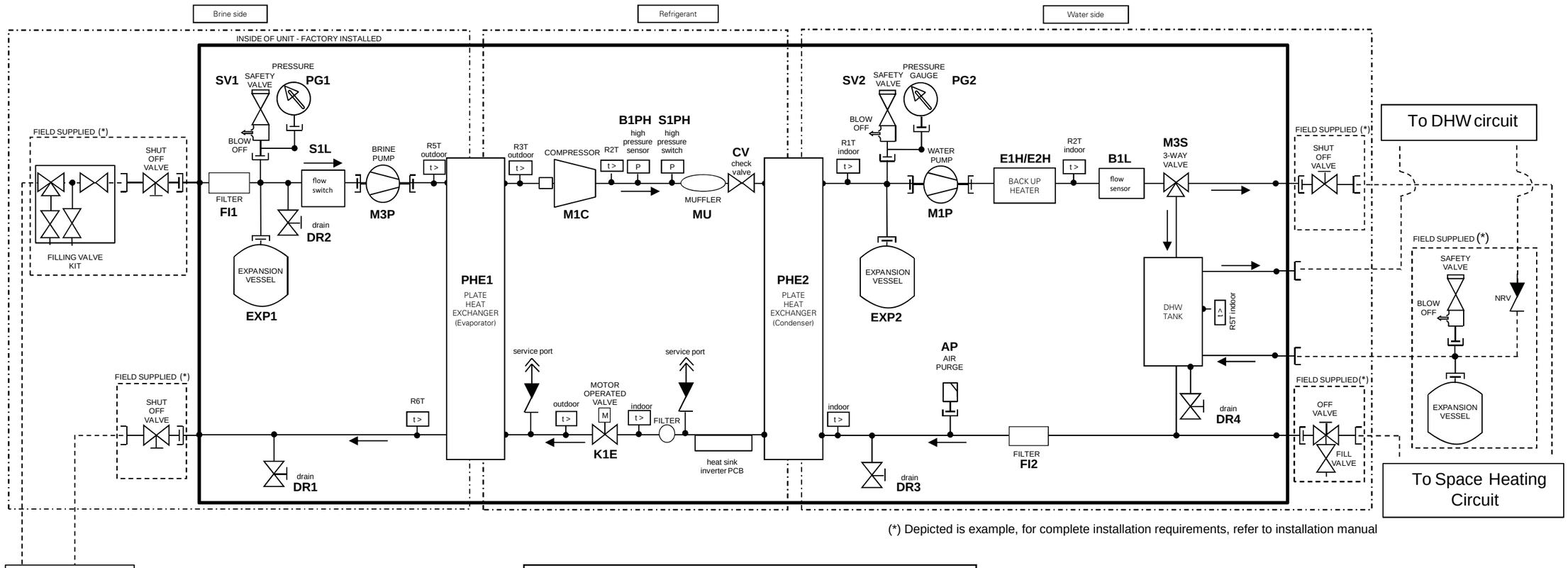
2.4 Wiring diagram 4

Figure 74 - Wiring diagram 4 (PCB A9P / A10P)



3. Piping diagram

Figure 75 - Piping diagram

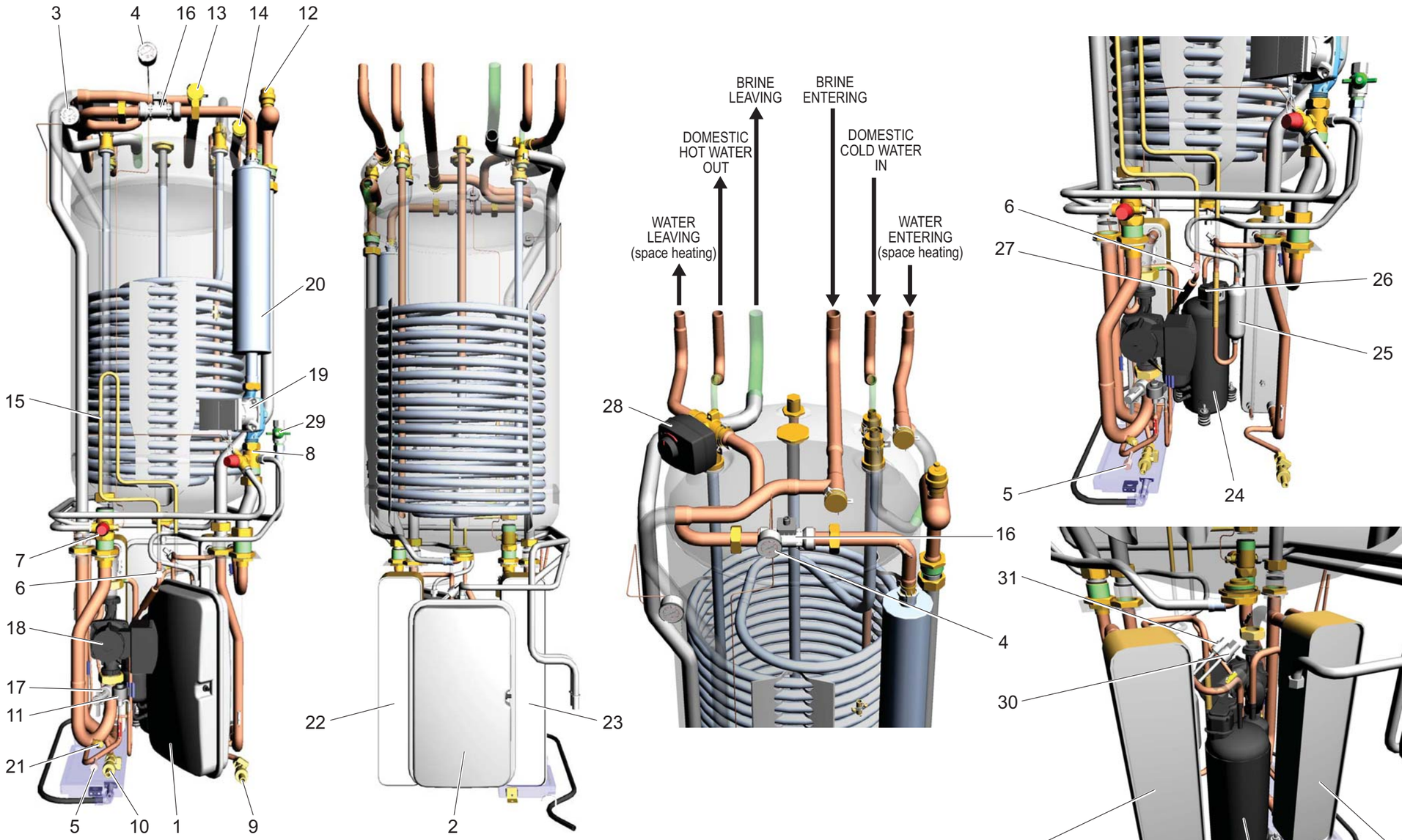


(*) Depicted is example, for complete installation requirements, refer to installation manual

Description sensors	
R1T in	Outlet water temperature sensor (LWC)
R2T in	After BUH temperature sensor
R3T in	Refrigerant liquid temperature sensor
R4T in	Inlet water temperature sensor (EWC)
R5T in	DHW tank temperature sensor
R1T out	Ambient air sensor
R2T out	Discharge sensor
R3T out	Suction sensor
R4T out	2 phase sensor (Tx)
R5T out	Brine entering water
R6T out	Brine leaving water
R10T	Inverter heat sink

4. Piping overview

Figure 76 - Piping overview

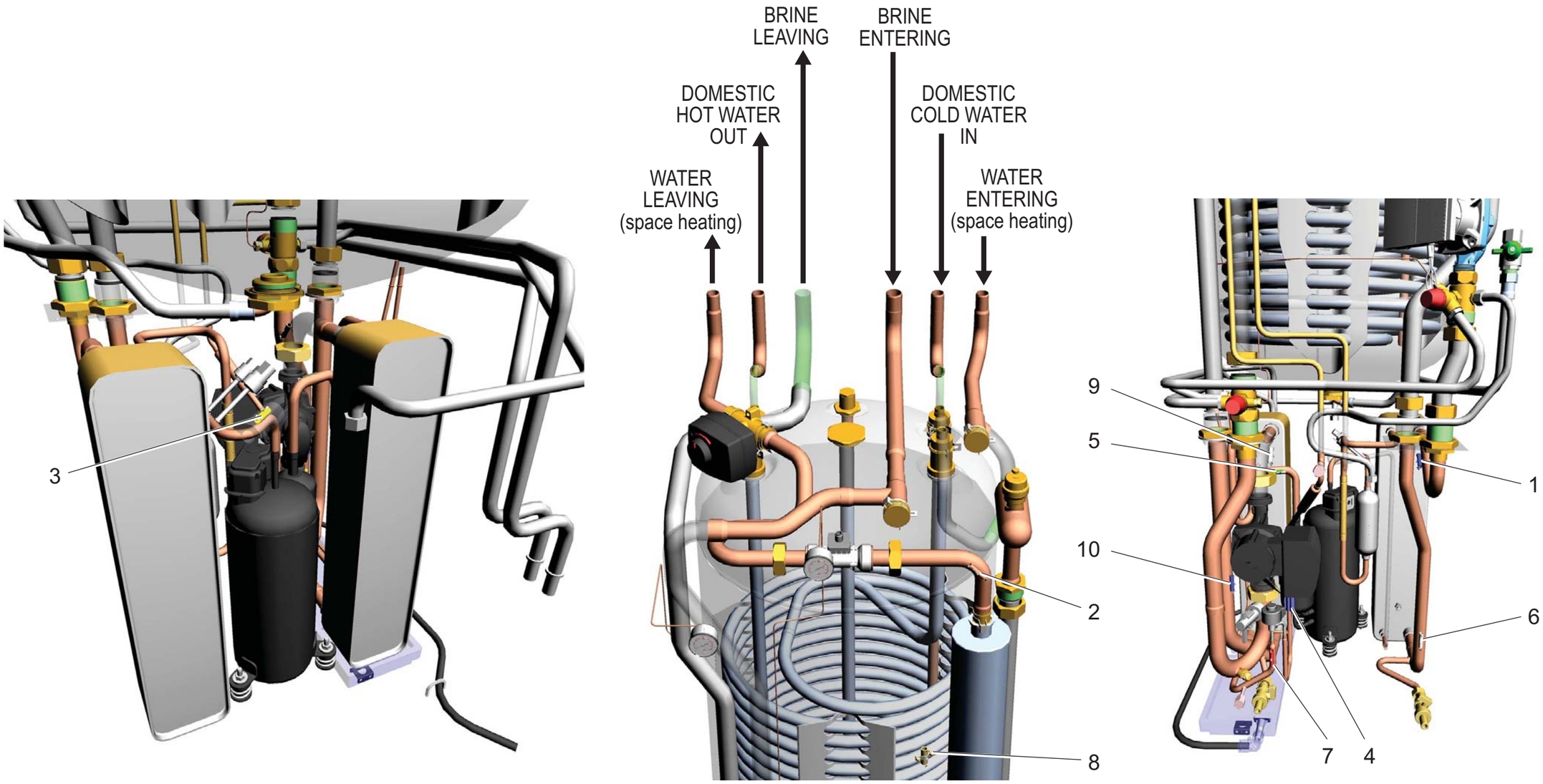


Legend

1 Expansion vessel water side
2 Expansion vessel brine side
3 Pressure gauge (water)
4 Pressure gauge (brine)
5 Low pressure refrigerant service port
6 High pressure refrigerant service port
7 Safety valve brine side
8 Safety valve water side
9 Drain valve brine (DR1)
10 Drain valve water (DR3)
11 Expansion valve
12 Air purge valve
13 Brine filter
14 Water filter
15 Cooling element inverter heat sink
16 Flow sensor
17 Flow switch
18 Brine pump
19 Water pump
20 Back up heater
21 Drain valve brine (DR2)
22 Plate type heat exchanger (evaporator)
23 Plate type heat exchanger (condensor)
24 Compressor
25 Muffler
26 Check valve
27 Refrigerant filter
28 3-Way valve
29 Drain valve tank (DR4)
30 High pressure sensor
31 High pressure switch

5. Thermistors

Figure 77 - Thermistors



Legend

1	R1T IN Outlet water temperature sensor
2	R2T IN BUH Temperature sensor
3	R2T OUT Discharge sensor
4	R3T IN Refrigerant liquid temperature sensor
5	R3T OUT Suction sensor
6	R4T IN Inlet water temperature sensor
7	R4T OUT Two phase sensor
8	R5T IN DHW Tank temperature sensor
9	R5T OUT Brine entering water
10	R6T OUT Brine leaving water

In case a problem occurred on the unit which could not be resolved by using the content of this service manual or in case you have a problem which could be resolved but of which the manufacturer should be notified, we advise you to contact your distributor.

To facilitate the investigation, additional information is required. Please fill out the following form before contacting your distributor.

DAIKIN

FIELD INFORMATION REPORT

Key person info	
Name:	Company name:
Your contact details Phone number:	E-mail address:
Site address:	
Your reference:	Date of visit:

Claim info	
Title:	
Problem description:	
Error code:	Trouble date:
Problem frequency:	
Investigation steps done:	
Current situation (solved, not solved, …):	
Countermeasures taken:	
Comments and proposals:	
Part available for return (if applicable):	

Application info
Application (house, apartment, office, …):
New project or refurbishment:
Heat emitters (radiators / under floor heating / fan coils / …):
Hydraulic layout (simple schematic):

Unit / Installation info	
Model name:	Serial number:
Installation / commissioning date:	Software version hydro PCB:
Software version user interface:	Software version outdoor PCB:
Minimum water volume:	Maximum water volume:
Brine composition and mixture:	
Brine freeze up temperature:	
Space heating control (leaving water temperature, room thermostat, ext. room thermostat):	
Space heating setpoint:	
Domestic hot water control (reheat only, schedule only, reheat + schedule):	
Domestic hot water setpoint:	

Provide pictures of the field settings overview (viewable on the user interface).